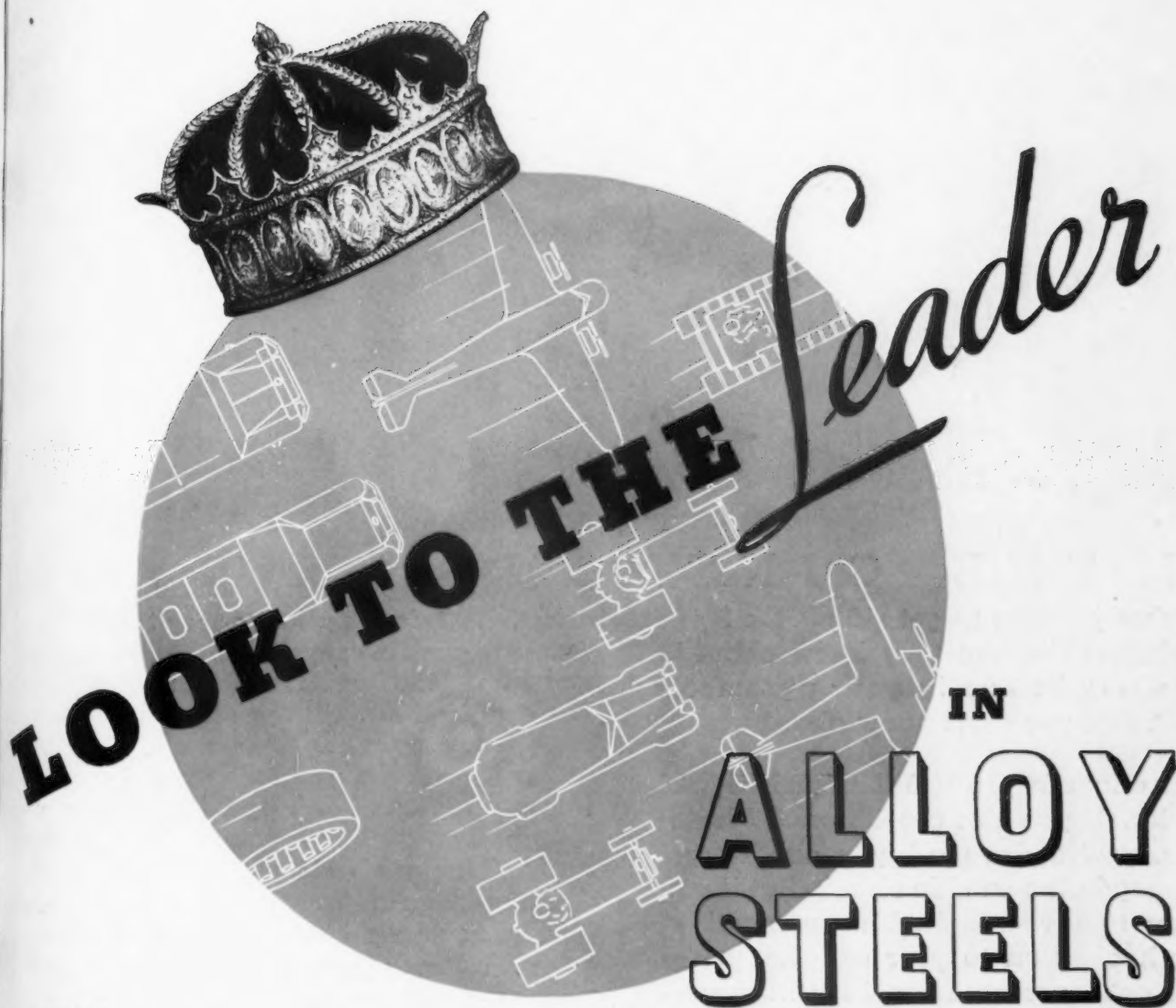


APRIL 30, 1936

MAY 1 - 1936

THE IRON AGE



IF YOU are looking for better performance and lower costs... if the design of your product or the service to which the product is subjected makes the task of steel selection a difficult one... if you have any kind of a problem in steel... look to Republic, the leader in alloy steels.

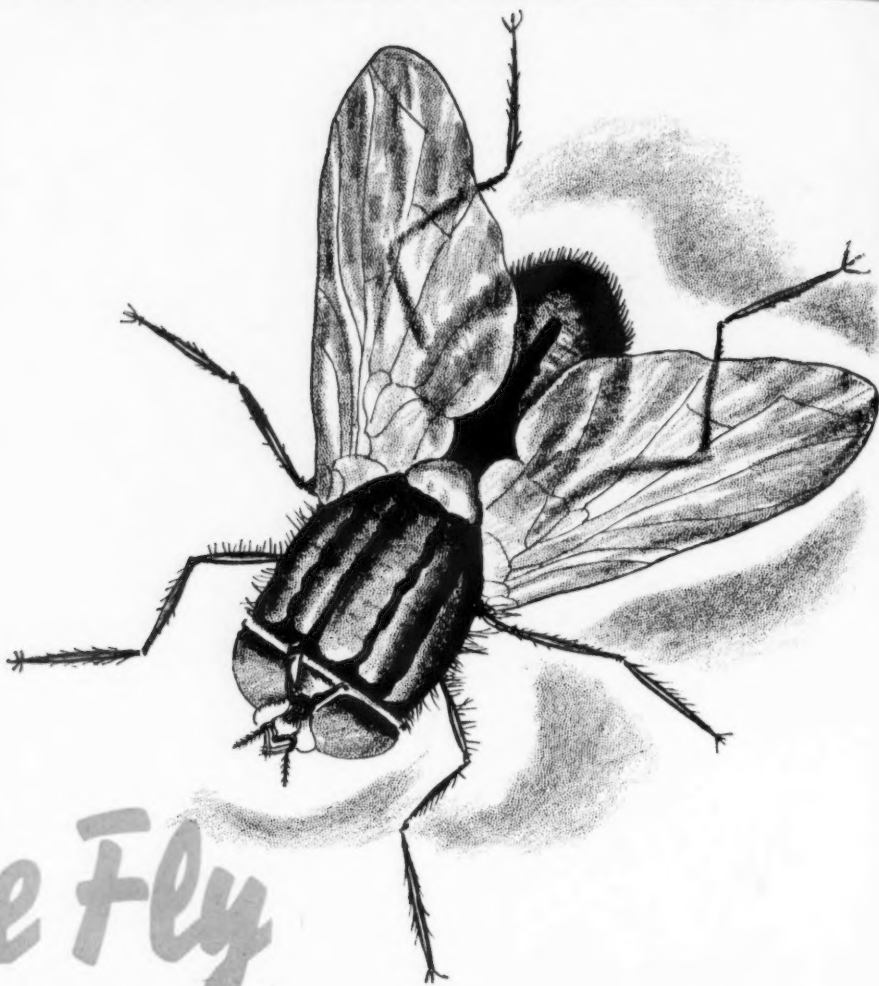
As the world's largest producer of alloy steels, and as a major producer of fine carbon steels,

Republic is eminently equipped to assist you. Republic's Metallurgists, men who pioneered in the development of many of the analyses now recognized as standard, are abreast of every development. Republic's Research Laboratories are the largest in the industry.

If you have a problem in steel, or if you would like a copy of Republic's new handbook, "Agathon Alloy Steels," write to Department IA.



Republic Steel CORPORATION
ALLOY STEEL DIVISION, MASSILLON, OHIO
GENERAL OFFICES: CLEVELAND, OHIO



The Fly

IN THE OINTMENT

Everybody wants to get rid of "the fly in the ointment"—when they know about it. There may be one in your pyrometer circuit, that you don't know about.

We'll assume you use Chromel-Alumel Couples. If you also use Chromel-Alumel Leads, you've done all you can to get accuracy in the outside circuit. But if you happen to have so-called "compensating" leads hooked on to your couples, you're apt to get inaccurate readings.... In such a hookup, the leads and couples are not of the same composition, and where they join you of course have a thermo-electric

effect. If this junction doesn't get very warm, there is no significant error. But as you know, that junction often gets quite hot, and in that case the error is apt to be more than you want to tolerate. And the hotter it gets, the greater is the error.... General Motors, Ford, and Armco, for example, know these facts, and now use only Chromel-Alumel Leads with Chromel-Alumel Couples. For thus, they eliminate the possibility of the above error.... You owe it to yourself, we think, to get a full exposition of this subject which you'll find in Folder-GI.... Send for a copy.... Hoskins Manufacturing Company, Detroit, Michigan.

Hoskins



CHROMEL-ALUMEL

LEADS AND COUPLES

2—THE IRON AGE, April 30, 1936

THE IRON AGE, published every Thursday by the CHILTON CO., (INC.), Chestnut & 56th Sts., Philadelphia, Pa. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. \$6.00 a year in U. S., Canada \$8.50, Foreign \$12.00. Vol. 137, No. 18.

THE IRON AGE

CHESTNUT AND 56TH STREETS, PHILADELPHIA, PA.
Sales Offices
239 WEST 39TH STREET NEW YORK, N. Y.

Owned and Published by



CHILTON COMPANY
(Incorporated)

Executive and Publication Offices,
Chestnut and 56th Sts., Philadelphia, Pa.

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C. S. BAUR, General Advertising Manager

A. H. DIX, Manager Reader Service

Member, Audit Bureau of Circulations

ADVERTISING STAFF

Member, Associated Business Papers

Indexed in the Industrial Arts Index.

Published every Thursday. Subscription

Price: United States and Pos-

sessions, Mexico, Cuba, \$6.00; Can-

ada, \$8.50, including duty; Foreign

\$12.00 a year. Single copy, 25 cents.

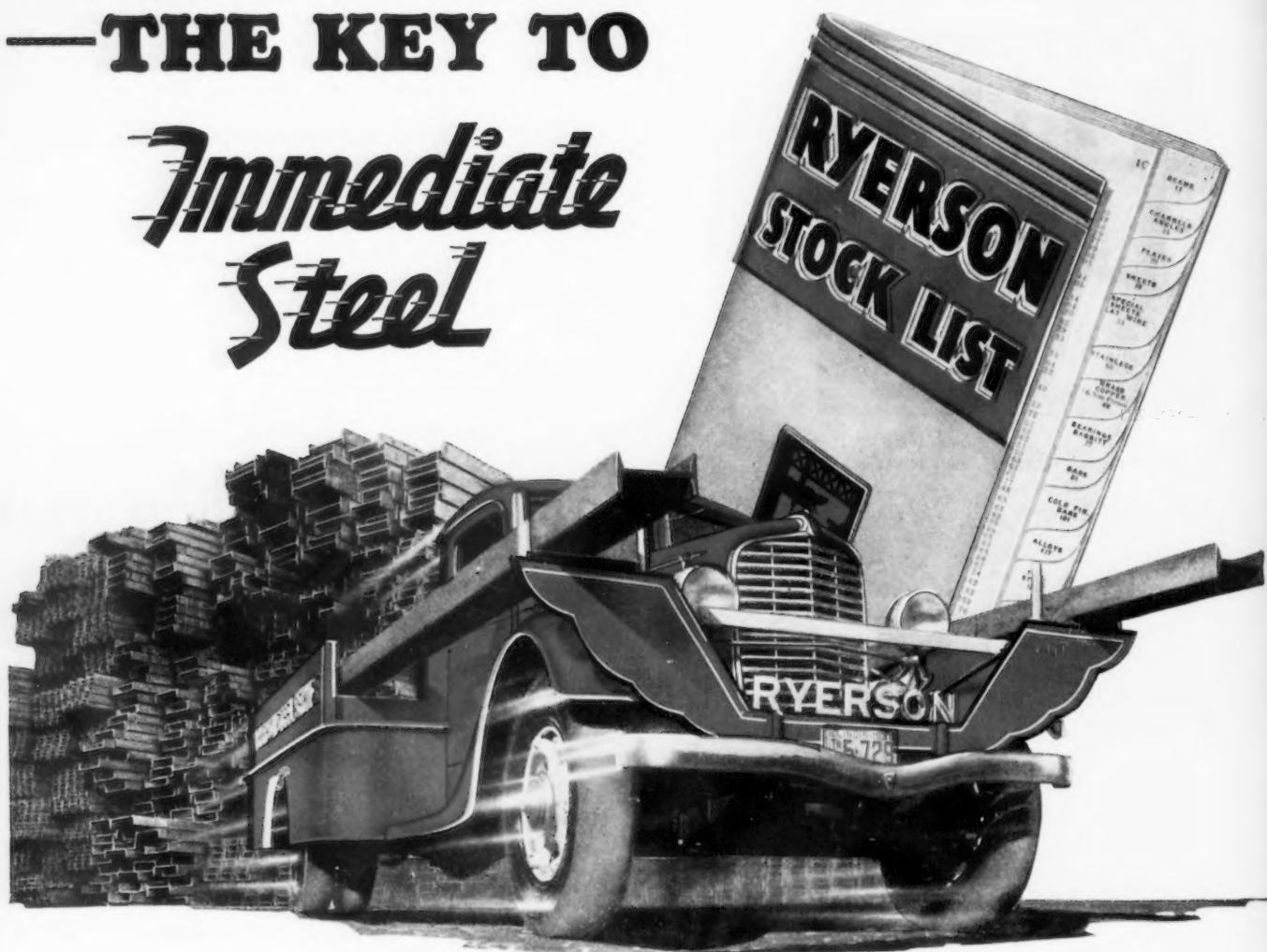
Cable Address, "Ironage, N. Y."

Emerson Findley, 621 Union Bldg., Cleveland
B. L. Herman, 675 Delaware Ave., Buffalo,
N. Y.

H. K. Hottenstein, 802 Otis Bldg., Chicago
Pelree Lewis, 7310 Woodward Ave., Detroit
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—THE KEY TO *Immediate Steel*



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STEEL - SERVICE

THE IRON AGE

APRIL 30, 1936

ESTABLISHED 1855

Vol. 136, No. 18

A Niagara of Molten Metal

THREE million tons of molten metal, ferrous and non-ferrous, flowing in a year's time from the cupolas and furnaces of America into the molds in American foundries. A Niagara of shimmering, seething, liquid metal, passing the ordeal of flame to take form and solidity as basic parts of our industrial structure.

No infant industry, this, which commands such volume. Indeed, one of the world's oldest industries, this of casting, going back at least 2000 years into antiquity where its beginnings are forgotten.

Yet, while no infant, still perhaps in its infancy. While so large, sure to become larger. An industry that has become rejuvenated in the past few years and is reaching out for new things to do.

Such is the industry which embraces the ancient and honorable art of casting in metal and which marks its progress in convention and exhibition in Detroit next week.

This issue of The Iron Age is dedicated to that notable occasion and to the industry which it celebrates.

J. H. Van Dine

The Largest and the Oldest Iron Castings

By THOMAS T. REED

ONE would naturally expect to go back to antiquity to find the oldest example of iron molding but most of us would look for the largest casting somewhere in the very recent pages of modern industry's history. Strangely enough, we are wrong, for according to Mr. Reed, who is an authority on these subjects, the largest single casting was made nearly 1000 years ago.

It is quite fitting to begin this issue, which celebrates the forthcoming Foundry Convention, with an article which so interestingly portrays the remote background of an ancient and honorable profession.



PEOPLE generally evince special interest in anything that can be pointed out as being the first, or the largest, of its kind. This is quite reasonable, for it sets what in mathematics would be termed limits of variation, and so may be claimed to show a scientific attitude of mind rather than mere curiosity. However, it is frequently much more difficult to establish these limits in technology than it is in mathematics. Instead of making absolute statements we can only

indicate the degree of probable accuracy that attaches to them.

As to the largest iron casting ever made there exists a very high degree of probability. It appears to be the lion shown in the accompanying illustration, which still stands where it was first cast, in the yard of the K'ai Yüan monastery, in the ancient city of Ts'ang-chou, almost a thousand years ago. It is not far from the modern sta-

tion of Ts'ang-chou, on the Tientsin-Pukow railway, about fifty miles south of Tientsin. The photograph was secured for me by Clarke Harris, and for the following data on it I am obliged to various persons, but chiefly C. F. Wang, former director of government mining operations in Manchuria.

The statue is 17 Chinese ft. high and 16 long, or about 20 and 18 of



THIS cast iron lion, made in China in 953 A.D., is said to be the largest single casting ever made. It is 20 ft. high and about 18 ft. long and was made as a pedestal to hold a cast iron Buddha.

our feet. On the right of the neck and near the teeth appear the characters "Ta Chou Kuang Shun san nien chu," that is, "cast in the third year of Kuang Shun," or 953 A. D. On its breast are characters stating that it was made by Li Yun, of Shantung Province, and two names that appear inside the head are surmised to perhaps refer to the artist who designed it and the metallurgist who cast it. At various points both inside and out of the casting are characters which have been interpreted as texts of Buddhist scripture.

In the face of this positive evidence it is strange that the story regarding this lion, most commonly repeated in China, is that the Emperor Shi Tsung (T'ai Tsu's successor) permitted a criminal to atone for his (probably political) crime by casting the lion to maintain the peace and order of the province or (in variant version),



HERE we see the oldest "dated" cast iron cannon, Chinese, of course, and poured by some pig-tailed artisan in 1377 A.D. We would not want to be on hand if it were to be fired.

o o o



THESE images are the oldest known examples of iron castings. They are dated between 200 B.C. and 200 A.D., and were found in Chinese graves. However, there is reason to believe that the art of iron casting goes back much further than these examples indicate.

to guard the city. The story is inherently improbable, because Shi Tsung was not a Buddhist and the bowl on the statue's back is obviously a lotus seat for the Bodhisattva. There is a cast iron Buddha at Tung Kuan-hsien, about fifty miles further south along the railroad, which may have once

¹ Kuang Shun is the name of the reign of the Emperor T'ai Tsu.

occupied the seat, since it is recorded that the statue toppled over in 1803 and parts of the tail and belly were broken and have been carried away. It was set upright again in 1893.

The true story of the casting probably is that Li Yun, a devout Buddhist and a rich man, presented it to the K'ai Yüan monastery for much the same reasons that im-

pelled rich men to build cathedrals in Europe in the 16th century. The Emperors T'ai Tsu and Shih Tsung probably had nothing to do with it; the reference to the reigning emperor being the ordinary way, in China, of fixing a date. The design is not particularly unusual, as similar figures carved from stone, and of comparable date, are known to exist. Its chief interest lies in its being so large and so early an iron casting.

No data are available as to the thickness of the casting and so it is impracticable to guess its weight. Nor is there specific information as to whether it is all in one piece, or whether the lotus seat and head are separate castings. Even if they are, it would still be the largest iron casting of which I

have been able to obtain any record.

The Oldest Casting

As to the oldest iron casting the certainty is much less. The oldest positively dated casting I have yet been able to find is a sacrificial bowl which stands in the yard of the Yü-ch'üan temple, in Tang-yang-hsien, Hupei. It is shaped like an incense burner, about 3 ft. high and 4½ ft. in diameter, with human figures for legs. It is dated 615 A.D., according to plate 39 of Vol. IV of Tokiwa and Sakino's *Buddhist Monuments of China*. There are numerous iron castings, still in existence, that are quite certainly much older than that. Many people have seen the cast iron stove, now in the Field Museum, Chicago, which has been described by Laufer¹ and also the small cast iron objects shown in Fig. 2 which are on exhibition in the Royal Ontario Museum of Archeology, Toronto. Unfortunately none of these bears a date, and their age can only be guessed from the fact of their having been dis-

¹ Pub. 192. Field Museum. p. 79-80, 1917.

interred from Han dynasty graves. As the two Han dynasties lasted from B.C. 206 to A.D. 221 this is not very precise. But since Wang Mang, who ruled from 9 to 25 A.D., is reported to have cast coins of iron, it seems highly probable that iron castings were made in China before the beginning of the Christian era.

If we can rely on literary evidence, there was a flourishing iron industry in China in the second century B. C., and I have set forth in the *Geographical Review* (Oct. 1934, p. 544-54) my reasons for believing that that was a cast, rather than a wrought, iron industry, though the rest of the world at that time knew only the latter. The very earliest reference to cast iron in China to which any reliability can be attached occurs in the *Tso Chuan*, where it is said that two officials of the state of Ts'in requisitioned 650 lb. of iron in order to cast a vessel, on which the criminal code was inscribed, in the year 513 B.C.

Here our search for the earliest iron casting seems to end, since no one can guess how long the art of

iron casting must have been practiced before the making of a 650-lb. one would be notable only because of its connection with the criminal code. Because of the ease with which iron castings are broken up and remelted probably none much older than the beginning of the Christian era are likely ever to be found, for even if buried in a grave they would probably have returned to rust by this time.

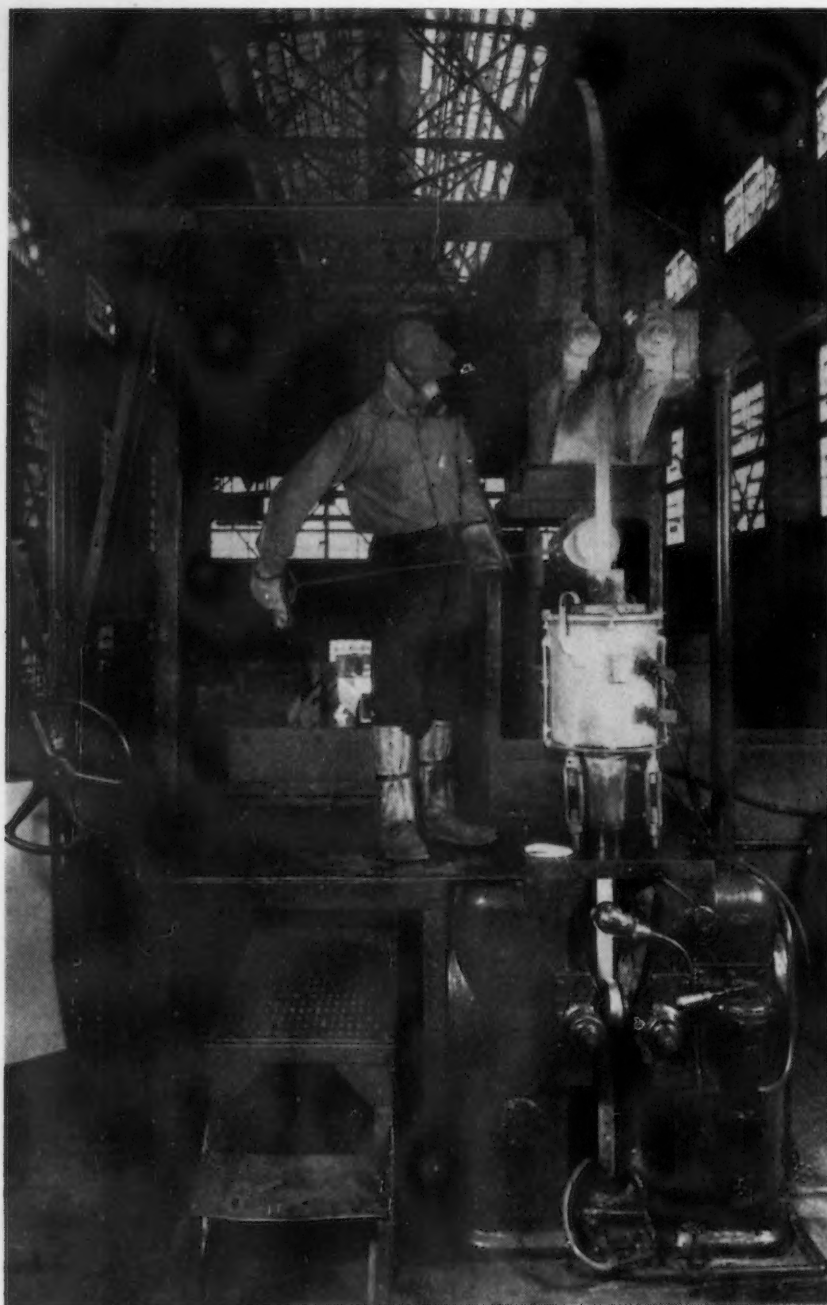
Oddly enough, in spite of the widespread erroneous belief that the art of casting in iron was "invented" in Europe in the 14th century, there is some evidence in Greek literature that Theodorus the Samian, in the 6th century B.C., also "invented how to pour iron and fabricate statues from it." Discussion as to why the Greeks and Romans made so few iron castings that some people assert they made none at all need not be repeated here, as it can be found in the article cited above. But it seems clear that if ever we do find the first iron casting it will date from some time prior to 600 B.C., and it will probably be found in China.



AN iron furnace as depicted upon an early Greek vase. Though intended to produce blooms, it could have been and probably was used also for melting iron for casting.

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Ford's New

of the metal is being extended to other car parts, it has been found desirable to increase facilities at the Rouge plant for making cast alloy steel parts. Accordingly, an alloy steel casting department has been constructed and equipped in the north end of the Rouge foundry at a cost of \$675,000. This department, recently put into full operation, has a capacity of 175 tons a day. Included in its equipment are four new electric furnaces, a complete mold and sand handling system, core and heat treating ovens and furnaces, and mechanization of materials handling. The department has a web of overhead conveyors and other types of mechanical transportation which keeps costs down and relieves workmen of back-breaking tasks. For the comfort of workmen, an air conditioning system has been installed.

New Electric Furnaces

The electric furnaces are of the newest and most improved top-charge type, this system of charging resulting in marked economies in power consumption and electrode expense. Refractory maintenance is also slightly lower with the top-charge furnace as against a furnace charged through the door.

The top-charge equipment employs fluid pressure furnished by suitable motor pump to raise the furnace roof and superstructure above the body of the furnace and rotate them aside so that the furnace may be charged quickly by means of a drop-bottom bucket lowered by crane into the hearth.

Previous to availability of actual performance data to the contrary, it was believed that opening up the furnace hearth for charging would allow heat to escape to such an extent that door-charge furnaces would show lower power consumption per ton. However, the time of



IN the manufacture of many important parts going into Ford V-8 cars, alloy steel castings have replaced forgings. The crankshaft, formerly a forged product, has been made of cast alloy steel for the last two years and more recently a cast camshaft has been substituted for a forged camshaft. Ford is extending rapidly its use of cast alloy steel, one of the notable developments being the pistons for the new Lincoln-Zephyr.

Ford's cast alloy steel is a product which has been developed by

its own metallurgical laboratories. Its physical characteristics are superior in many respects to those of forged steel. It is claimed that the use of this new metal makes possible special designs which are not practical in forgings. Its advantages are not only in superior quality of the cast parts, but also in lowered manufacturing costs.

One of the features of Ford cast alloy steel parts is the close tolerances to which they can be held.

Capacity, 175 Tons a Day

Since these cast products have proved so satisfactory and the use

w Facilities for Casting Alloy Steels

"power off" to "power on" between heats with the top-charge furnace has proved so short that it is resulting in lower power consumption than door-charge operations.

The heavy roof-lifting cylinder is stationary and separate from the furnace shell. The roof-lift-swing-aside movement is made by a powerful ram from the stationary cylinder. This ram has a tapered and keyed head so as to enter and engage accurately its match-machined receiving socket in the steel column eye casting which carries all the superstructure and roof parts so that they may be handled as a unit.

When the ram returns the roof to normal operating position on the body, it lowers to its normal inoperative position, thus disengaging the column eye casting so that the furnace may be operated and tapped in all respects as a fixed-roof, door-charge type of furnace, with integral masts attached to and tilting with the furnace body. When a small vertical lift of the roof has been effected by the ram, the cam mechanism integral with the ram begins automatically to impart a smooth rotating action to the roof superstructure assembly and to the ram, due to its travel in the cam slot provided.

Protecting Interlocks

All operations of the furnace are protected by sequence movement interlocks. The electrode arms are counterbalanced, this "floating arm" feature improving the precision of control and contributing to economies.

These top-charge furnaces are especially adapted to use of bulky charges of scrap, such as borings, turnings, trimmings, flashings and shear scrap. Large pieces may be melted which otherwise would require being "torched up" to be put through the furnace door. The drop bottom charging bucket is

loaded by electro-magnet, brought alongside the charging floor by crane and lowered by crane into the furnace as soon as the roof has been swung clear of the bezel ring.

Time taken to raise and swing the roof from the Ford furnaces, which usually operate on five to six-ton heats, is about 15 seconds.

THE electric furnace has been a magic wand for the modern foundry. It has opened doors to castings that were before tightly closed to them. Imagine what would have been said, even ten years ago, had one suggested the production of cast crank and camshafts!

Because of the rapid developments in the use of alloy steel castings, the Ford Motor Co. has added to its Rouge foundry a special department devoted to this work.

The interval of "power off" to "power on" between heats is averaging under five minutes.

Sand Practice

Provision has been made for the most modern sand practice in the foundry, with control at all times of the variables in the sand, such as permeability, strength, "fines" and moisture. The sand is cleaned of metallic and other refuse, being screened in a revolving hexagonal screen which is completely housed and exhausted to provide for control of the amount of "fines" in the sand.

After being cleaned and

screened, the sand is stored in a bin located over 1-ton batch measuring hoppers, which in turn are directly above double-discharge air-operated mixers. All additions of bond, moisture and seacoal are made in these mixers, which are equipped with anti-friction bearings. Thus a minimum amount of moisture and bond is required for the desired workability of the sand.

The capacity of each mixer is 2000 to 2500 lb. of sand per batch, and the mixing cycle is two minutes. A continuous flow of sand in the mixer is assured by the equalizing hoppers above and below the mixer, and at the same time batch control is secured. The mixers are housed and exhausted, the entire unit being virtually dust free.

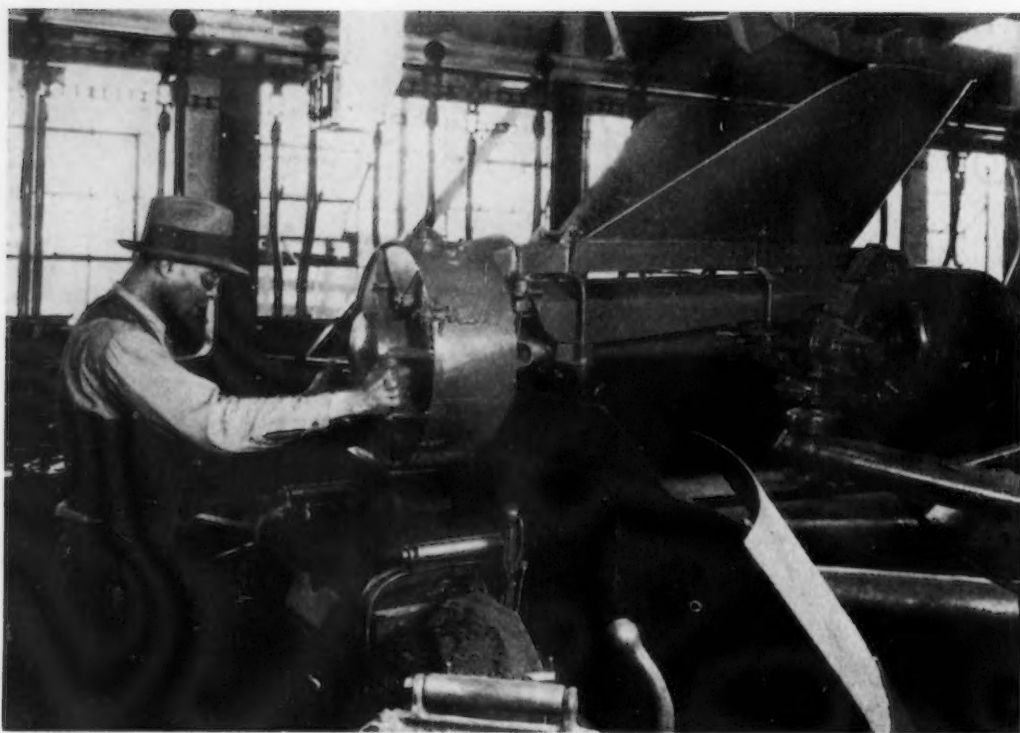
The fines control equipment maintains permeability within the necessary limits without addition of new sand except to replace the amount going out on the castings to the cleaning room.

After being mixed, the sand is aerated in a 50-ton-per-hour aerator as it is charged into the prepared sand hopper feeding the sandslinger. It is possible, therefore, to get a uniform sand with maximum flowability, minimum bond and moisture, and in ideal condition for molding. Much of the ability to secure almost infinitesimal limits in connection with the production of steel castings in the Ford foundry is due to the excellence of the sand control and sand handling system.

Productive capacity of the mixers is 25 to 40 tons per hour per machine. A batch of sand is discharged in 14 seconds by means of the two air-operated openings in each mixer. Loading requires seven to 10 seconds.

Core Ovens

A number of vertical continuous core ovens have been installed for



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SMALL as well as large alloy steel castings are made in the new Ford steel foundry.

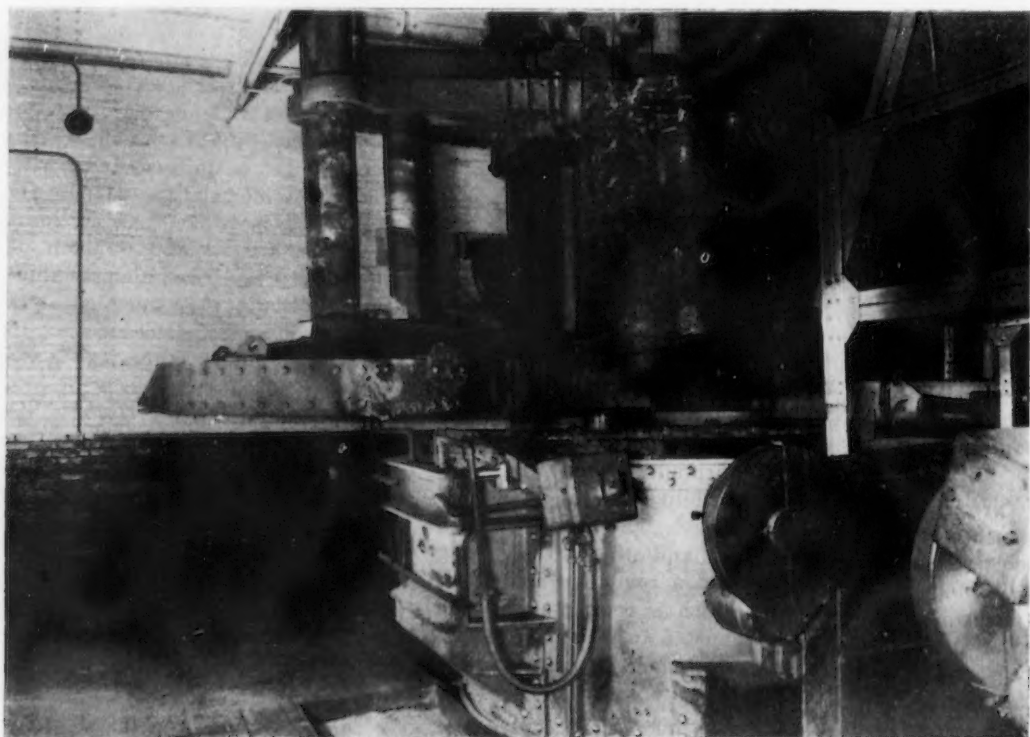
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baking cores and for paste drying. Most of them are arranged in pairs of two compartments each and are 9½ ft. wide, 9 ft. 2½ in. deep and 46 ft. high. Ovens are heated by gas, using the counterflow principle with burners near the bottom in a brick combustion chamber. The oven heat is controlled by a recording controller and diaphragm

valve. Cooling is accomplished by two 21-in. pressure fans.

Each rack in the ovens can carry a core and plate load of about 1000 lb. The conveyor speed varies from six to 24 in. per minute. Power for the conveyor is furnished by a 3-hp. motor. The racks are suspended on 36-in. centers and are 24 x 89 inches.

Several types of alloy cast steel parts are made in the new foundry department. Low carbon copper silicon steel is used for such parts as clutch pedals, generator frames, universal joint castings, radius rod feet and roller bearing sleeves. Analysis of the metal for the clutch pedal, for instance, is as follows: Carbon 0.15 to 0.35 per cent;



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ELECTRIC furnaces are of the new top charge type.

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o o o

OVERHEAD conveyors and optical pyrometers cooperate in delivering proper metal to molds.

o o o



manganese 0.40 to 0.60 per cent; silicon 0.60 to 0.80 per cent; sulphur 0.08 per cent maximum; copper 1.50 to 2.00 per cent; and phosphorus 0.08 per cent maximum. Tensile strength of clutch pedal casting is 80,000 lb., elongation 13 per cent and Brinell hardness 156 to 179.

Another type of alloy steel part

cast in the foundry contains 1.00 per cent of carbon, 1.00 per cent of copper and 1.50 to 2.00 per cent of silicon.

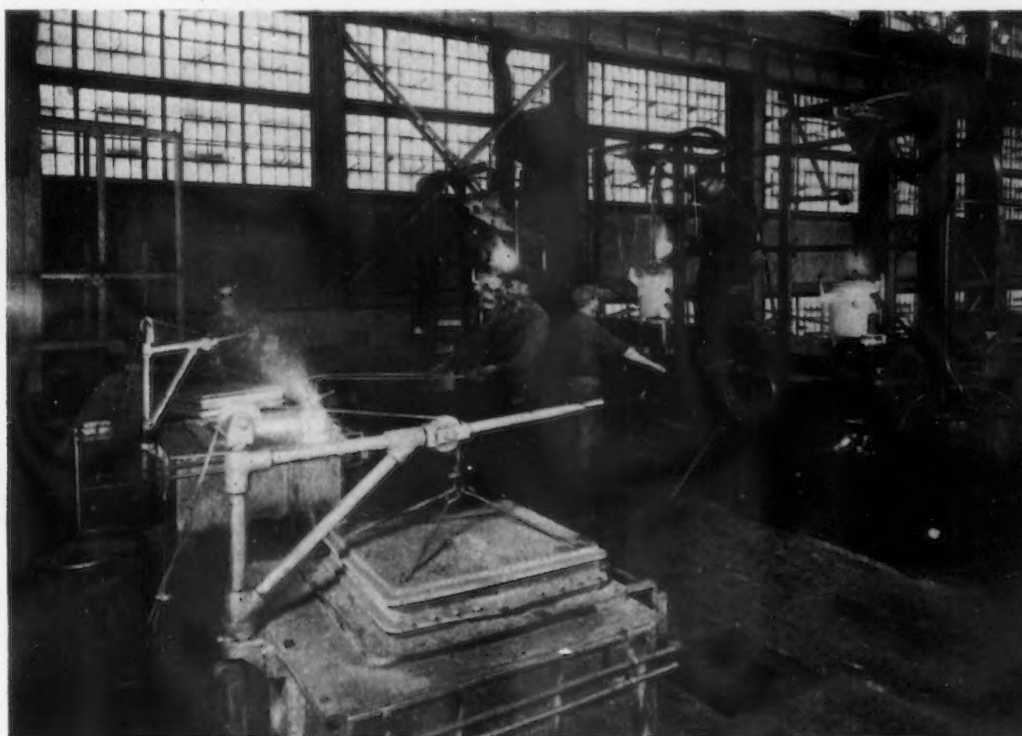
In conformity with long-established Ford practice, the alloy steel department uses overhead monorail conveyors to transfer hot metal from the electric furnaces to points near the pouring stations, where

it is transferred to hand ladles. Metal is poured into the molds as they move along on a conveyor at convenient pouring height. Molds cool as they are carried toward the shakeout and the castings cool further as they are carried along on an overhead monorail conveyor to the next department for cleaning operations.

o o o

FACILITIES for heat treating are provided.

o o o



Examining The Foundry Of Tomorrow Through the Spectacles of Imagination

By HERBERT M. RAMP

HERE is a touch of prophecy added to the experience of 40 years and devoted to viewing the foundry of tomorrow through the spectacles of imagination.

"No more dull iron" says the author, in this foundry of tomorrow, in which melting methods will be radically changed and temperature control will be on a par with precise control of mixtures. Sand mixing too, will come in for considerable improvement as will many of the familiar operations, mechanisms and materials used in the foundry of today.



WE have spent much literary effort in recording what has been done in the past twenty years to improve our foundry practice, and we point with pride to the advancement made in improved

building construction giving better facilities for economical and direct operations, for improved heating, lighting and ventilation, for better arrangements for the handling of materials, and for labor saving and cost reducing machinery. We feel that the foundry has been lifted up from a rather mean position in the mechanical world and placed

abreast the machine shop and other manufacturing establishments on a higher industrial plane.

There has been considerable pioneering in its domain, many trails have been blazed, the research man with the chemist has turned the light of chemistry and analysis into the dark and traditional corners of the molders art,





the constructive brains of industry have been called to its assistance with gratifying results.

But there is so much ground yet to be covered, so much that is left undone, so many problems not mastered, that a touch of imagination added to the experience of forty years may be of interest to those who live by the foundry.

What does the future hold? What lines of practice are most likely to be explored to the greatest advantage? This is the interest of every inquiring foundryman.

The writer believes that our method of melting iron in the foundry will be radically changed, the cupola as we now understand it will become as obsolete as the horse

and buggy, and our melting processes will be accomplished through the agency of electricity or gas.

We will be able to melt what we want when we want it, with very small chemical change. Imagine if you will the economy and convenience of being able to melt a large or small charge as needed and to be fortified with the knowledge that

the resultant iron will come within a very close margin of what you desire.

The composition of the iron will be controlled because it will not come into contact with the incandescent coke, and over temperatures that burn out part of the elements desired will be under regulation. We will not have to set a special time to take off the heat and will not be ruled by the cupola preparation, or the hourly melting capacity; also, we will not have to carry as much surplus labor to care for the melted iron as soon as it is ready to use.

No More Dull Iron

What a boon it will be to be able to control the temperature of the metal to our needs. Dull iron will be unnecessary and we will not have to pig some of our iron because it has grown too cold. The electric furnace has shown us the wonderful possibilities of the control of temperatures and mixtures. No one thing will take more of the tradition and uncertainty out of the foundry business than this. We will be able to use cheaper mixtures, for the melting loss of vital elements will be lower and the control greater. The expense as a whole will not be greater when we learn to conserve and use properly the forces of heat.

Considerable change will be made in the method and form of our purchase of foundry supplies. Today we try to tie up the manufacturer of the material we purchase to some definite analysis or rule. We tell him what his goods must register, and if he meets those specifications, his skirts are clear; in other words, we set up for the manufacturer a standard from our limited experience to supplant the hundred fold more knowledge he possesses of his own business.

We will learn to formulate not a chemical or other hard and fast

standard, but a standard based on performance. We will tell the manufacturer what we must do with his product and leave the composition to him. Our equipment will be altered and improved; for example, most molding machines today are built for a specific class of work or pattern. Their flexibility is limited and require special pattern or flask equipment, and they rarely are profitable to use on small orders. There is a wide field for molding machines that can be adapted to ordinary patterns without expensive pattern changes or special flasks. This may be questioned as to its possibility, but there has been several devices of this character used in the past that have great merit if they were perfected and developed.

Molding Machines for Jobbing Work

Molding machines for production jobs cannot be criticized—they pay as well as can be expected when the production justifies the expense of the initial cost; but for the work of a jobbing or miscellaneous character, there has not been enough research work done to give the foundry the benefit of machine help on castings of this kind, and the future holds a great opportunity for work in this direction.

Molding sand, the great fundamental in molding, has been explored to some extent in recent years, but the edges have only been touched in this work. So much can be done in the using and mixing of proper grades of sand, so much better and smoother castings can be produced, so much smaller loss in defective castings can be attained. Proper mixtures will make possible the use of sand much stronger in bond, that will permit the use of less bars in the flasks, less gaggers, less nails, and quicker operations. The possibilities here are enormous and will change many of the prac-

tices in molding, when these opportunities are more generally appreciated.

The blacking of molds for heavy castings will be perfected so it can be sprayed on the molds, and air dried in a few minutes without the application of heat, giving the casting the appearance of a dry sand mold. Some work has already been done in this direction.

The chemist and research man will be more in evidence in the foundry than ever, with this difference—the foundryman will appreciate the value of their assistance, and the chemist will learn there are problems in the foundry that can only be mastered by the combination of the knowledge of the chemist and the experience of the foundryman.

Pattern Making

In pattern making there is a great opening for progress; patterns for a limited number of castings will be made from some material that can be quickly and easily formed to desired shape. This is not entirely new, but little permanent progress has been accomplished as yet.

The demand from the purchaser of castings for a much closer dimensioned product, on account of jigs and fixtures used in machining or assembling castings, will compel the foundries to use far greater care in the construction of patterns, core boxes, flasks, and other equipment to produce the more nearly perfect castings. The foundry cannot avoid this demand for a higher grade product because the requirements of customers will compel an advance as the improvement in machine tools has reduced the limits in machine work, so will the foundries be forced to furnish a higher grade product to meet the demands of progress and make their improvements conform to this end.





Casting Gray Iron Under Pressure In Metal Molds

By L. M. WAITE

"DIE CASTING" cast iron, you might call it, though its sponsors prefer not to because of the vast difference between casting iron under pressure and casting the lower temperature metals usually associated with that process.

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AFTER long experimentation, by the Wetherill Engineering Co., Philadelphia, successful results are now claimed in the

casting of gray iron under pressure whether in metal molds or in sand. The company avoids the term "die casting" because it is associated with low-melting-point metals while, with gray iron, a vastly different condition prevails in heat, heat distribution, and in operating pressures for both metal flowing and die closing.

Reference to the line drawing, Fig. 1, will serve to simplify this introduction of the problem which has received constant attention at the hands of the Wetherill group, headed by Lt. Colonel Samuel P.

Wetherill, over a long period of years, and which has been dedicated to the precision control of foundry variables. More recently, it has required seven years to perfect a semi-commercial set-up which was ultimately worked out through practical application of research efforts along all the lines involved.

In Fig. 1 is illustrated a circular steel shell, "A," lined with refractory, and housing a crucible, "B," into which is assembled a nozzle member having a reduced-hole cap, "C."

Around this crucible, through openings as illustrated, flames are constantly playing, maintaining a molten-metal heat at approximately 2700 deg. F. The nozzle member, "C," of the crucible is an assembly member of the final or casting crucible only. It is not employed in other crucibles to which reference will be made. The principles of each crucible are otherwise the same, whether transferring, transporting, loading or casting. To the casting crucible a mold-closing mechanism with molds is directly attached or seated.

The entry of the molten metal to any one of the crucibles employed is through a gasketed sleeve and plug, "E," the latter member of which has a tapped hole in its center for admission of metal-raising air pressure after the crucible has been filled up to the dotted line, "D."

Assuming that we are now at a

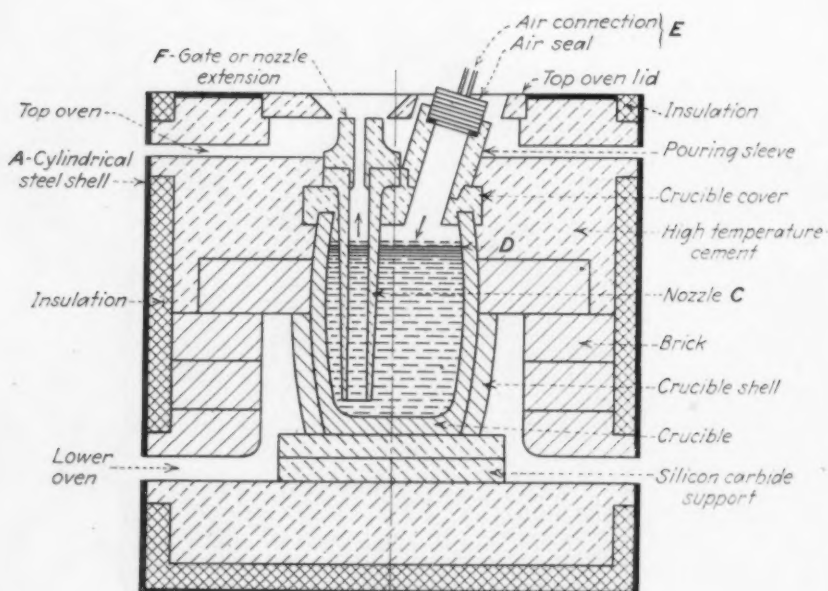
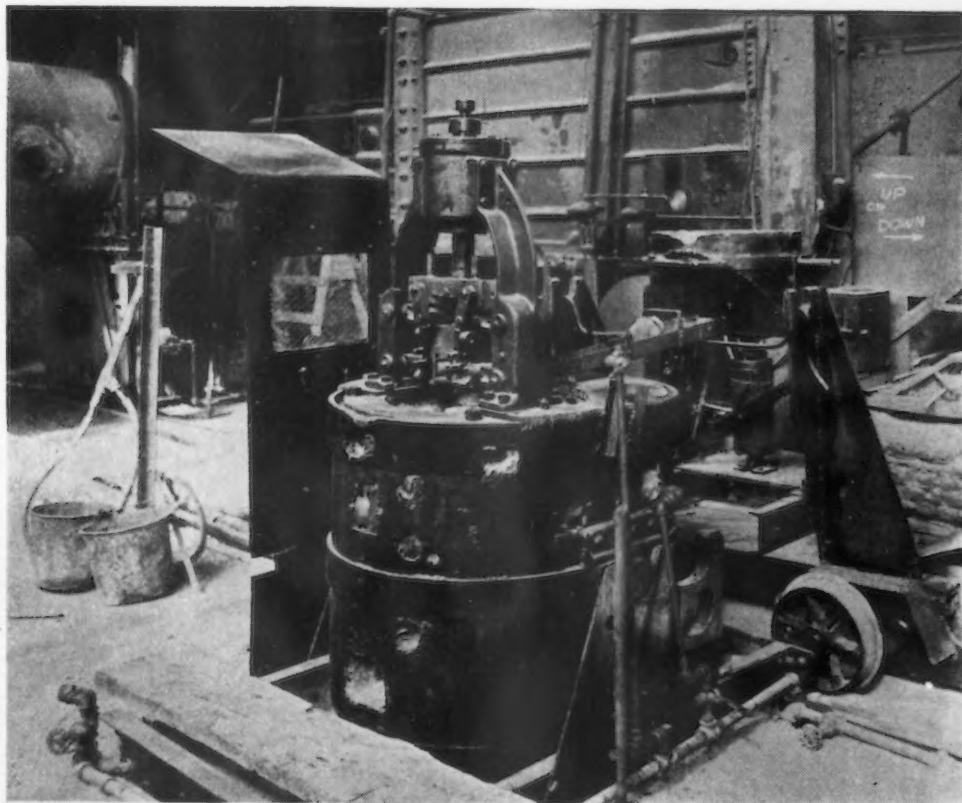


FIG. 1—The ill effects of oxidation are avoided through the filling of the feed nozzle "C", from the lower part of the crucible and charging dies or molds with a slow steady flow rather than with a "shot".

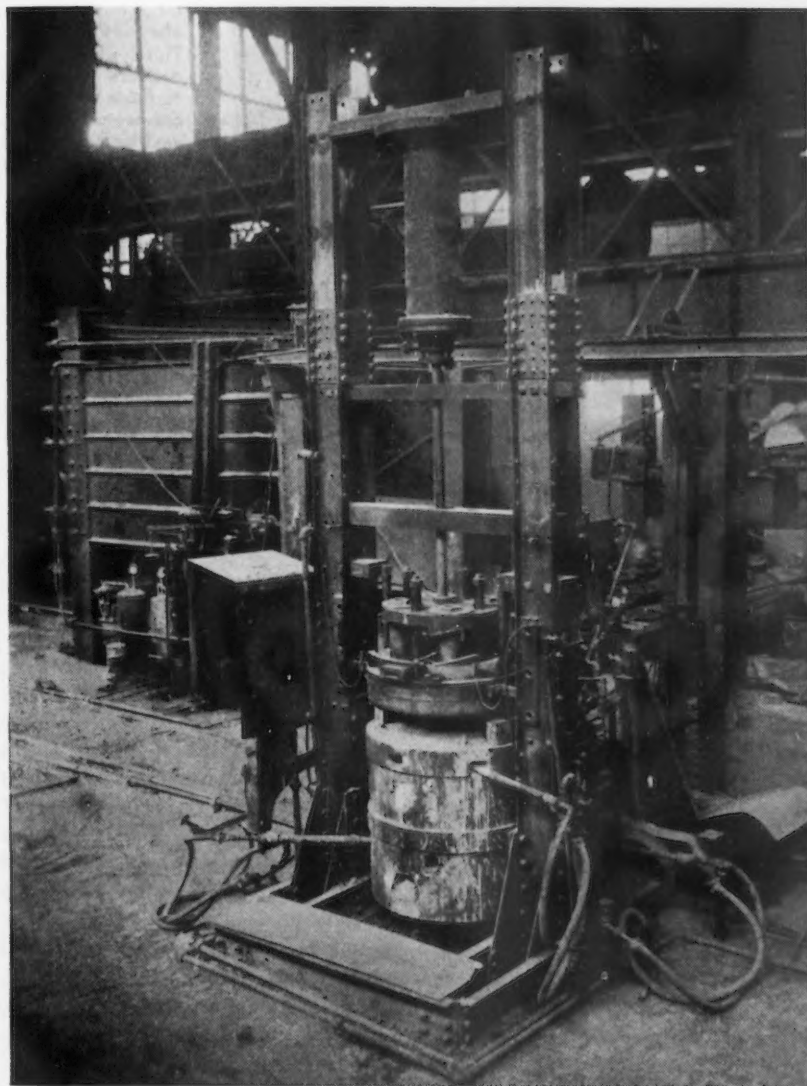
AT RIGHT

FIG. 2—In this illustration, the transfer ladle can be seen in back of the casting machine. The crucible of the casting machine is being filled with molten metal.



BELOW

FIG. 3—This is one of the earlier types of casting machines. In both this and the previous illustration the rotary melting furnace is at the left, at the end of the transfer-ladle tracks.



casting machine, either Fig. 2 or 3, and that molten metal has been poured from a transferring ladle in sufficient quantity to fill the crucible up to the double dotted line:—through the small threaded opening in the cap of the plug member "E," preheated-air pressure is applied to the top of the molten metal. Obviously and factually this top pressure causes the molten metal, within the inserted and gasketed nozzle "C," to rise, forced from the bottom of the nozzle, above the double dotted line and up into the mold through the gate "F."

Because of controlled low pressure which instigates the rise, this movement of metal is a flowing advance which drives all air within the mold forward, out through proper vents and eliminates air-trapping, gas formation, or any tendency of metal to laminate because of trapped air or gasses. The pressure is maintained during the time interval necessary for complete mold or die filling, and during solidification; liquid communication with the supply of molten metal being assured, risers and sink

heads are not now required in producing sound and dense castings.

Alan Wood Steel Co., No. 2 Swede iron has been used all through experimental development and is regularly used in the casting of commercial parts. Commercial runs, making parts for customers, have been utilized in gaining constant running experience and in developing engineering data, for use in designing special equipment for particular parts selected

used, the capacity of the crucible limits the maximum weight of castings to be produced.

Illustrated equipment, Figs. 2 and 3, has a capacity to permit of casting about 300 lb. in one operation. Castings up to 165 lb. on a gate have been made.

Comparison with the die casting of so-called white metals brings out relative differences in pressures required to "shoot" or to "flow" metals in respective processes and

the desired casting. This shell is supported by a cast iron frame, in and around which cooling air can be circulated.

Ordinary cupola practice is not suited to the casting requirements of this Wetherill process which has a continuing need for metal at high temperatures and of exact analysis; that is, the process itself is continuous. To provide this continuity of supply a new type of gas or oil-fired melter rotary fur-

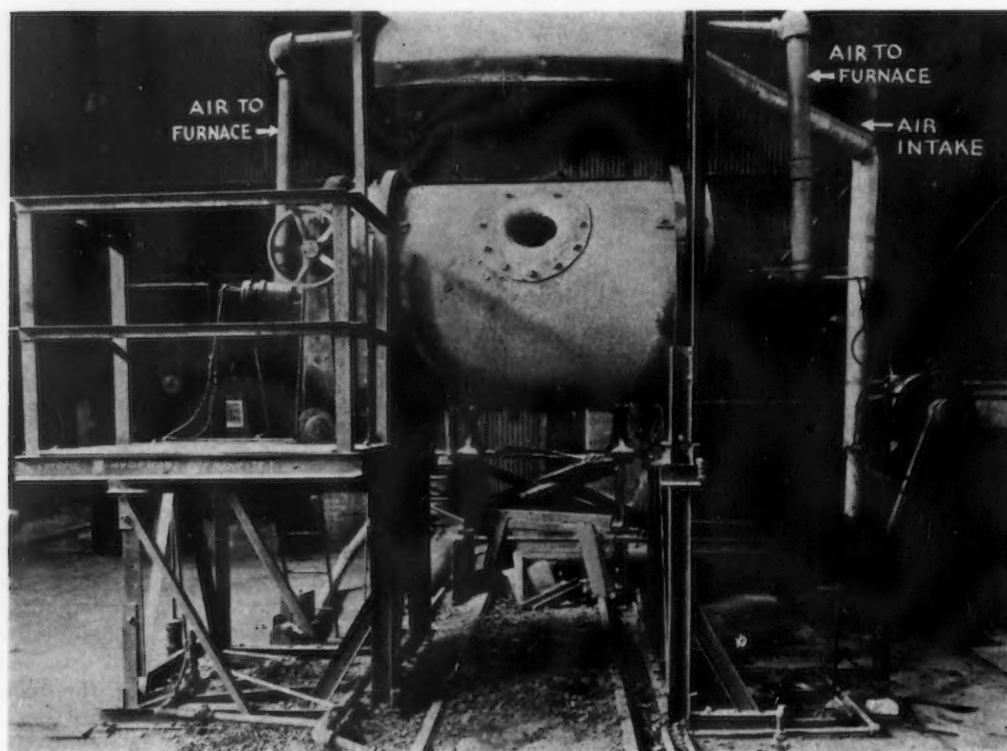


FIG. 4—In this illustration the pre-heated air trapping chamber shows above the furnace. Pipes which supply pressure to, as well as those which carry pre-heated air into, each end of the furnace are in evidence.

by customers, whether or not their plans may have contemplated equipping their foundries for the entire Wetherill process.

Very complete solution of the graphite, assured by the relatively high melting temperatures maintained, and the rapid dissipation through the mold walls of the liquid superheat, insures close grain. Chilling after solidification can be controlled or avoided at will. As a result, one Brinnell hardness can be obtained on one surface and a different Brinnell hardness on another surface, of the same casting.

As a standard crucible with lid is

under varying conditions of plasticity. In this casting field, Colonel Wetherill pioneered the making of aluminum bronze and monel metal permanent mold castings.

Dies of single or multiple cavities may be employed in this gray iron process as can inserts of both tubular and solid materials. Collapsible metal cores are sometimes employed but the process does not prevent sand cores if their use is of advantage. Castings are dense, have a fine grain and are remarkably free from blow-holes. Where non-chilled surfaces are desired, dies are constructed of a thin steel shell having the form and shape of

nace was developed, Fig. 4. It is said that this melter produces quality comparable to electric furnace iron, at costs favorable to melter operation. Oil heat is applied at both ends. Pre-heated air is trapped in the chamber shown above the rotary furnace, and is maintained at a temperature of 800 deg. F., and is forced through piping shown, into a burner at 32 oz. pressure. It is stated that with a consumption of 900 cu. ft. of air per min., and 24 gal. of crude oil per hr., a 1-ton melt of No. 2, Alan Wood Steel Co., Swede iron, including scrap iron, at 2850 deg. F., is economically obtained.

Weight Reductions Emphasize Benefits of Radiographic Casting Exploration

By LIEUT. COMMANDER
E. B. PERRY

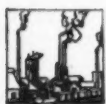
*Machinery Superintendent,
Philadelphia Navy Yard*

CUTTING a casting into parts to find out if it is good or not gives very definite results, but makes that particular casting rather useless. Yet this search for hidden flaws is imperative, particularly where the demand for lightness introduces the element of difficult sections. The use of the X-ray or the

Gamma-ray offers a way out of this dilemma and also enables the welding engineer a means of cooperating with the foundryman.

Commander Perry, the author, is of course expressing his own views in this article and not necessarily those of the naval service at large.

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SHIPBUILDING is truly "between the devil and the deep sea." On the one hand, increasing powers, higher pressures and elevated temperatures call for castings whose integrity is beyond reproach. On the other hand, due to weight limitations, every known means must be used to reduce weight by whatever means possible.

This practice of continually cutting down the poundage of the structure and plant of vessels has resulted in the use of castings of

very intricate design with very thin sections. Changes of section, sharp angles, heavy sections running into light sections, intricate design, inaccessible areas, flat plates leading from heavy walls and vice versa all drive the moulder to an early grave and make for casting which may be viewed with suspicion.

The integrity of a casting may be determined by actually cutting it up. By this method it is possible to learn if the casting is a good casting; whether or not it contains voids, tears, cracks or other de-

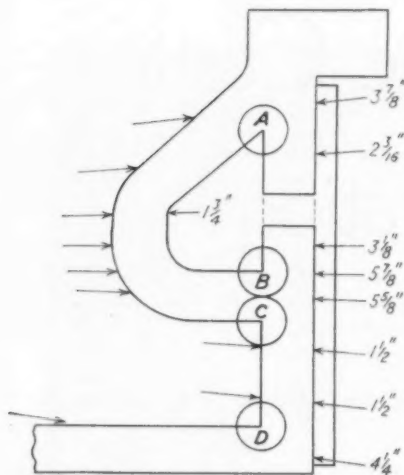
fects. This method is conclusive for the particular casting which has been cut up—but the casting ceases to be of much use except as a museum piece. There is this much satisfaction: each casting, cast from the same pattern, by the same methods and treatment, will be pretty much alike. If a pronounced defect is found in one casting of a lot, there is quite apt to be the same defect in each of the others. If the sample casting is found to be acceptable, there is a good likelihood that the others will be sound castings. The more sample castings which are cut up and found to be free of defects, the greater likelihood of obtaining sound castings.

Cutting Up is Expensive

Casting and cutting up the fruits of one's labor is a doubly expensive business. When a sound casting, free of all defects, is essential to the job in hand there is another and less expensive method available. The casting may be explored by means of the gamma ray; radiography. This method does not in-

jure the casting. Defects, if found, may be removed by machining or chipping them out and the casting salvaged by welding. The repaired casting may then be radiographed to prove the effectiveness of the weld, thus putting the stamp of approval on a good and thoroughly acceptable practice.

Castings may be X-rayed or gamma rayed. By these means, a record may be made, in black and white, of the actual condition of the section of the casting which has



SECTION of casting to be radiographed. The film holder is secured on the vertical wall of the casting.

been subjected to the gamma rays. Gamma raying is not new but it is, of necessity, coming into greater use just because castings are being "skun" in weight and are becoming more and more intricate, year by year. Modern practice, higher pressures and greater powers will demand lighter and lighter castings and will require that they be sound.

The process of gamma-raying, using radium as the source of the gamma rays, is rather interesting and is essentially as follows.

How It Works

The casting is set up in some place where it will be secure from movement and at a reasonable distance (twenty to thirty feet) from any personnel. The area to be investigated is cleared of surface defects, all surfaces so far as is possible, and a film holder containing duplicate films is placed firmly against one face of the area. The radium is then placed in such a position that the gamma rays from

the radium will pass through the area in question to the film holder with its films on the opposite side of the metal wall. The radium should generally be so placed that the ray which will impinge against the center of the film will be normal to the film. The distance at which the radium should be placed from the area to be gamma rayed depends upon (1) the amount of radium to be used, (2) the thickness of the wall to be investigated, (3) the space available for the placing of the radium, (4) the desirability of getting as nearly parallel rays as possible, and (5) the time available for the exposure.

The amount of radium, once obtained, is a fixed quantity. The thickness of the area under investigation is not so easily decided. The plans may show the designed thickness, but there is no assurance that the casting follows the plans. The area in question may, and probably will, be composed of varying wall sections. Some little judgment will

reasonably true to the area gamma-rayed, it is desirable that all rays enter the film at all points as nearly normal to the films as is possible. Finally, the time of exposure must be so governed that reasonable production may result consistent with reasonably good negatives.

Figure 2 is a series of curves which set forth the relationship between the distance of the radium from the area under investigation versus the time of exposure, for various wall thicknesses with a given amount of radium.

Length of Exposure

Let us now go back to Figure 1 and see what sort of a set-up we can make and determine, if possible, how long an exposure we will require. The film holder should be firmly secured on the flat surface if possible, and it is so shown. Due to space restrictions, let us assume that the radium can not be placed at a greater distance than twenty

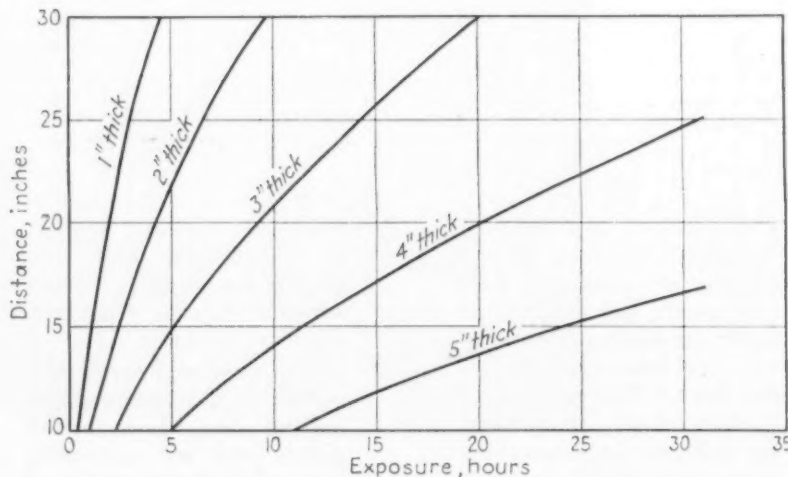


CHART for determining the length of exposure for various wall thicknesses, based upon the use of 200 mg. of radium.

have to be used in deciding upon what wall thickness will be considered as the wall thickness. Figure 1 is an example of a section which might have to be radiographed and is labeled with the wall thicknesses through which typical rays would have to travel with the set-up assumed. It will be noted that the wall thicknesses vary from one and one-half inches to five and seven-eighths inches.

The space available for placing the radium may vary from infinity to practically nothing. In order that the resulting prints may be

inches from the wall to be investigated. The radium will be placed at this maximum distance in order to make the gamma rays enter the films as nearly parallel as possible. This leaves only two variables: the wall thickness and the time of exposure.

The areas most suspected are those marked A, B, C and D. The wall thickness of area A varies from 3 7/8 in. to 2 3/16 in.; that is, the gamma rays must pass through that much metal before they reach the films. Area B varies from 3 1/8 in. to 5 5/8 in.; area C from 5 5/8 in.

to 1½ in., and area D from 1½ in. to 4¼ in.

What is the thickness of the wall? A straight average will give a wall thickness of a little over three inches. An average of the averages results in a wall thickness of a little under three inches. If we accept three inches as the wall thick-

used to give the correct exposure for areas A and B.

Using Horse Sense

If we are to be pure scientists, our analysis of the resulting exposures in the areas under question looks rather sad. Now is the time to use a little horse-sense. He who

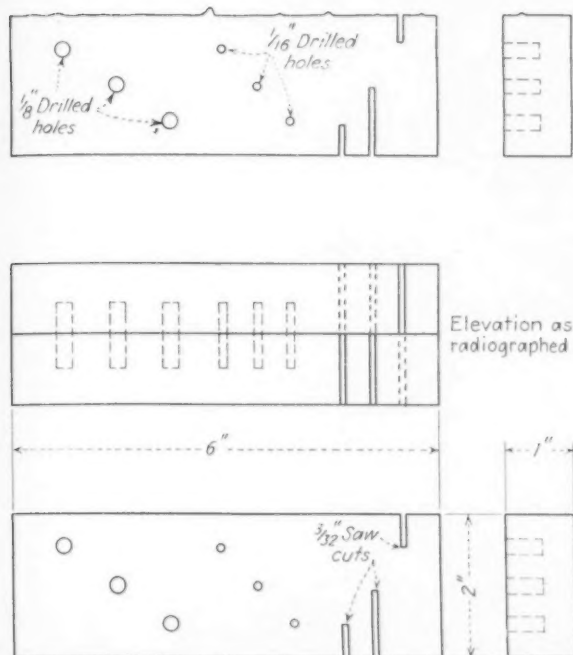
detail be desired, another exposure may be made assuming a different wall thickness. The point to be made is this: we are looking for the evidence of defects or their absence; we are not primarily concerned with a pretty negative. He who specializes on pretty negatives will obtain them, but he will probably miss some of the defects. He surely will lose out on production, for time is money and money is the gage of production.

Having made our exposure and developed the negatives, what do we get? The best answer to that is an example. Figure 3 is a sketch of two pieces of steel casting showing certain defects which were purposely introduced.

The pieces of steel shown in Figure 3 were gamma-rayed, one on top of the other, machined surface to machined surface. Figure 4 is a print made from a negative resulting from this exposure.

The Film is Best

A print made from a radiograph is not nearly as satisfactory as the film itself. This print does show the defects, however. In practice, the two developed films are actually placed one over the other and studied over a strong light which is shielded by a ground glass. Inexpensive "illuminators" are on the



ARTIFICIAL defects were machined into two cast steel blocks for the purpose of radiographic test checking.

ness, the correct time of exposure will be about nine hours and ten minutes.

Now let us examine each area separately. Area A will be well underexposed at the top and considerably overexposed at the bottom. Similarly, area B will be underexposed throughout. Area C will be underexposed at the top and overexposed at the bottom, while area D will be overexposed at the top and underexposed at the bottom. Had we used the time corresponding to a wall thickness of 1½ in., we would have obtained the correct exposure on one-half of both areas C and D, but the other half of each of those areas would have been considerably underexposed. There is no common wall thickness which could have been



HERE is the radiograph made from the two steel blocks. Note how easily interior defects can be recognized.

is investigating castings for defects should not assume the attitude of the pure scientist, but should remember his mission. That mission is not to obtain perfect negatives; it is to obtain sound castings.

The exposure of nine hours and ten minutes for a three-inch wall will result in a reasonably good negative which will disclose any defects which would be serious or worthy of repair. Should greater

market which give off a well-diffused, bluish-white light of the proper intensity for the easy detection of defects disclosed by the films. Using this equipment, thin sections in the casting show up as dark areas in the films; thick sections are relatively lighter. Voids appear dark, as do cracks and tears. Defects parallel to the gamma rays will be more readily exposed than similar defects normal to the rays. By moving one film over the other,

defects are more readily detected.

Now to a really important point in our story of radiography. He who attempts to diagnose a radiograph without access to and a careful study of the *actual* casting from which it was made is very apt to go astray. The films, having been marked up for the apparent defects, must be taken to the casting and the apparent defects checked by marking the suspected areas on the casting itself and then making a minute examination of the casting to determine whether or not the apparent defects may not be due to surface markings, chaplet marks, irregularities in the surface of the casting, chips in the casting or the angle at which the rays entered the film. It may be found advisable to re-radiograph

with a different exposure in order to bring out a particular area to the detriment of the remainder of the film.

Only a Tool

It is to be stressed that the gamma ray is only a tool. As with all other tools, the gamma ray may be used to good advantage or it may be misused. A skillful operator can search out very small defects. An unscrupulous operator can, by control of the time of exposure and the angle at which the exposure is made, hide all but the most glaring of defects. Having obtained the evidence of a defect by means of the gamma ray, the actual location of that defect in the casting will depend upon the skill of the investigator and his knowledge of the particular casting. In

this search it is well to remember that a fault found in one casting is good reason to suspect a like fault in a similar casting.

The equipment necessary for such a study of castings is either a small quantity of radium or an X-ray generating apparatus, a supply of high-speed film, film holders, a processing room and some type of illuminator. The technique of handling the film is similar to that of all photographic work. To be assured of good negatives, use only strictly fresh film which has not been stored near the source of gamma rays and be certain that the correct thickness of lead sheet is inserted in the film holders. A "mottled" film is evidence that one or more of the above cautions have not been met.

Foundry Cleaning Cost Reduced by Changes in Tumbling Material

THE G. H. R. Foundry Co., Dayton, Ohio, has just completed some exhaustive tests of cleaning methods which have resulted in a complete change of procedure in its cleaning department.

Until two months ago, the problem of cleaning 100 to 125 tons of 1-lb. to 2½-lb. castings daily was a serious one. The method used was to give each batch a tumble of

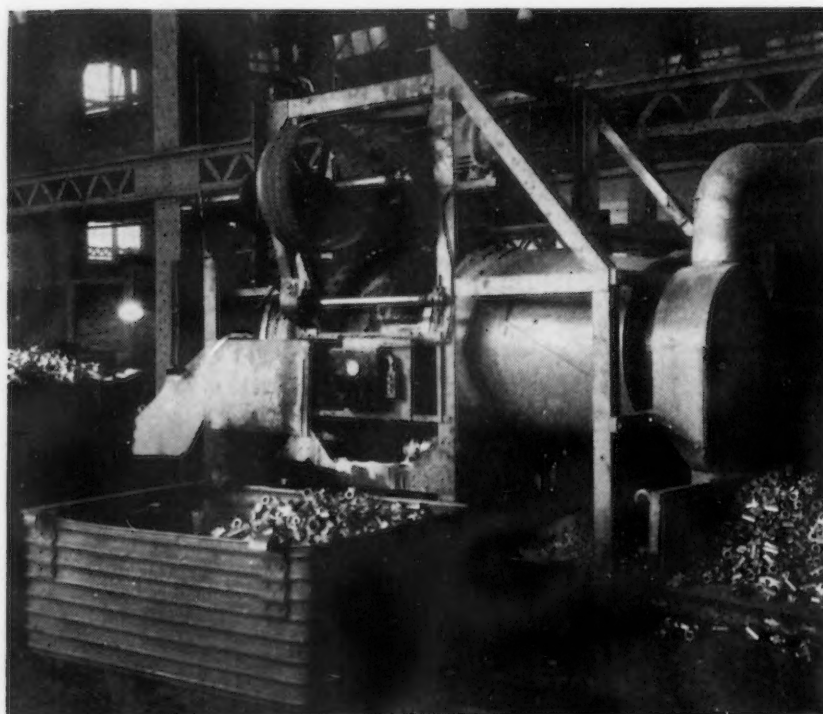
2½ hr. in a conventional side-loading tumbling barrel and then subject them for from 8 to 15 min. to sand cleaning in another barrel. Cleaning material for the latter barrel cost 25c. an hr., replacement parts \$1 an hr.

Through the cooperation of N. Ransohoff, Inc., Cincinnati, the foundry management installed an end-loading mill employing ½-in.

and ¼-in. stars and No. 3 crushed steel. Work is charged at the end of the mill by a power-operated loading skip and the parts float in the mass of tumbling material. Parts do not touch each other but are subjected to a rolling, scouring treatment which produces an excellent finish and still preserves sharp corners and intricate designs. Recesses in castings are thoroughly cleaned.

On continuous six-day runs, 24 hr. per day, it was found that the mill would handle 20 one-ton loads (14 cu. ft. each) every 24 hr. After 1540 hr. of operation, a change was made in the screen in the mill, permitting the addition of ¾-in. stars to the tumbling material. This change in tumbling material increased the mill's output to 27 one-ton loads every 24 hr. The new cleaning method reduced cleaning costs appreciably.

While some of the saving was due to the greater cleaning efficiency of the new methods, one important labor-saving factor is the arrangement in the Ideal mill by which reversal of drum rotation direction automatically separates work from tumbling material. Cleaned work emerges from the end of the mill to shop receptacles, a new load of work is taken in at the charging end and, again reversing the direction of the mill's rotation, all tumbling material is automatically returned to the tumbling compartment. The flotation method of tumbling has made such a cost reducing record that the cleaning department is being supplied with additional equipment for applying the process to a greater proportion of the foundry's output.



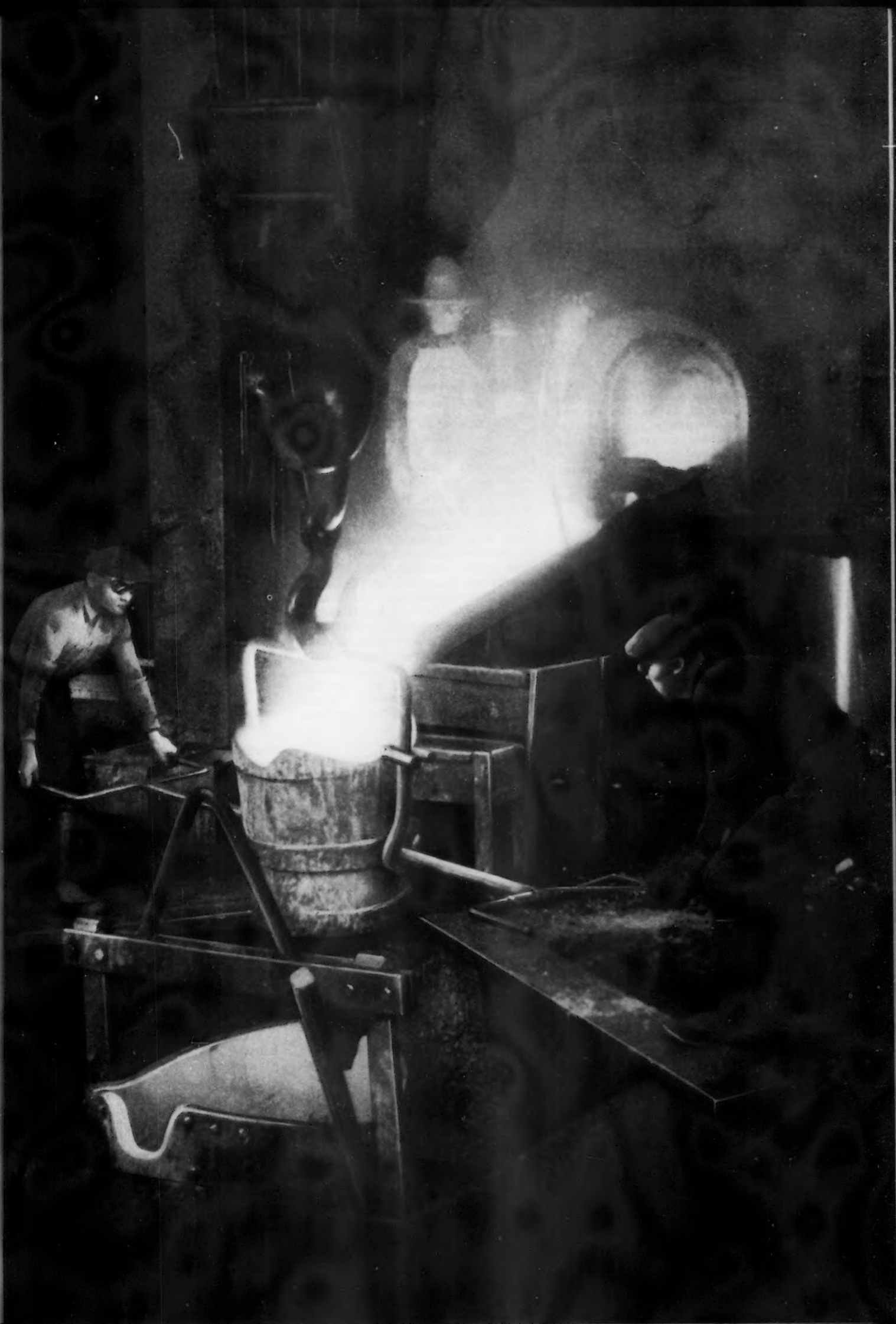
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Coordinated Effort Needed to R

PRIVATE leadership versus Governmental control in industry proved to be the central theme of discussion at the thirty-eighth annual convention of the National Metal Trades Association where those in attendance united upon a common platform in support of the former contention. The meeting, held at the Waldorf-Astoria Hotel, New York, April 22 and 23, was distinguished for its lucid comment on problems of industrial cooperation and for its analysis of the obstacles to success created by arbitrary New Deal interference.

Employer-employee relations dominated the two-day session at frequent intervals. The Association's Committee on Industrial Cooperation, established to study these relations, made known the results of its activities to date. Committee speakers did not hesitate to express a conviction that faulty leadership lay at the roots of much of the labor unrest and wasted industrial effort in this country. But, at the same time, what the association has done and is doing to eliminate errors of management was forcibly recounted.

It was stated that management's responsibility has not heretofore been clearly understood. In defining this term, the Committee said that "mutuality of interest," as between management and labor, was fundamental to the concept. It pointed out that "contacts between management and men are becoming less and less intimate," and that the challenge to industrial leadership today has reached a stage where subversive outside agencies are attempting to wrest control from its proper sphere. As one member expressed it, "American industrial management is on trial at the bar of public opinion. It must either meet its responsibility, or turn over the job to the political henchmen of the next NRA."

What Government Is Doing To Industry

The fate of an industrial system in which Government plays a dominant role was described by subsequent speakers. The Guffey coal act, the Walsh Government contracting bill, the 30-hr. week bill, the O'Mahoney licensing bill, the new corporate tax program and other pieces of New Deal legislation were critically attacked. The Guffey coal act, it was stated, marks the emergence of New Deal substitute legislation by which eventually the Administration hopes to circumvent defunct NRA and establish a piece-meal regulation over industry. The Wagner Labor Relations bill was examined. That the bill is not working out was conclusively proved. Moreover, the speaker in this instance compared its present status to that of the moribund Blue Eagle codes prior to official pronouncement of their death by the Supreme Court.

It was significant that practically the entire speaking forum presented a common front against the New Deal. Declaring that the present Administration in Washington is socialistic, and has seized every occasion to capitalize on the ignorance of a working class rendered miserable by a great depression, it accused the New Deal of preaching a false doctrine of scarcity so as to achieve permanence for its so-called "emergency" legislation.

Various titles of the Social Security law were analyzed. Aside from its practical administrative difficulties, it was contended that the law would seriously interfere with any future attempt by a more conservative governing body to balance this nation's budget. Elsewhere the act, particularly in its unemployment insurance or compensation clauses, was stated to be an instrument of the present Administration's labor policy. Failing in its promise to "put every



C. H. STRAWBRIDGE

man to work," the New Deal, it was stated, is now concerned with removing pressure from the labor market by retiring as many workers as possible. As a consequence, "the Social Security Act, in its relation to employment, can be considered as a fine upon an employer for every man he hires."

Infringement of private rights by a political body not content with its measure of constitutional power will persist unless public opinion is strongly aligned against it, it was stated. The unsound, un-American principles implicit in present trends of government were declared to be embryonic of the "controlled state" idea which is manifest in certain countries of Europe at the present time. Stricter adherence to constitutional law was urged. The achievements of American industry, which have bestowed upon this country a higher standard of living than is enjoyed by nationals in any other country the world over, were declared to be "not an accident." Therefore, it was urged that the system's integrity be not allowed

to Restore Industrial Independence

to fall into disrepute at the hands of radicalism, political entrepreneurs, and other proponents of false government.

In rebuttal of these tendencies, business executives and other responsible persons are now actively engaged in consolidating economic gains made since the depression was at its worst. It was also stated that they are looking ahead to the future, with mutual interests of labor and management at stake. Plans for proceeding carefully, as



ALEXANDER SELLERS

yet in the formative stage, are none the less assuming substance. The broad scope of business' interest in economic, social, educational and other problems of national welfare was depicted in part, at least, by the N.M.T.A.'s Committee on Industrial Cooperation. Members of the association were said to be taking an active part in shaping the destiny of their individual communities. Youth occupational problems, attacked through public school boards of education, were referred to. More attention to the "human equation," as op-

posed to machinery and low-cost production factors, was urged upon factory managers. A need for more highly trained foremen was cited, as the speaker at this point reminded his audience that "the foreman is the only direct link between management and men."

Fundamentally, the interests of management and labor were stated to be identical, and cooperation between these groups was exhorted as the only means of building a satisfactory economic structure. The New Deal, in its lust for dictatorial power, was accused of directly retarding recovery by inciting class antagonism and by shackling industry with burdensome taxes, unfair and unsound labor relations bills and other specimens of muddled legislation.

Executive Should Retain Leadership

Stating that "the transcendental problem of mankind is to be as supreme all of the time as it is some of the time," H. W. Johnson, vice-president and works manager, De Laval Steam Turbine Co.,



N. W. PICKERING

Trenton, N. J., opened discussion of the N.M.T.A.'s Committee on Industrial Cooperation. This, in part, represented the "problem" as referred to in the title of Mr. Johnson's speech. Applied to the subject under comment, it should signify to industrial management that cooperation, "the symbol of character in industry, must be developed painstakingly," the speaker declared. "We must not take for granted that what is being done is the best that can be done," but must work tirelessly to promote a greater degree of sympathy and understanding between management and labor, the aim being to construct as lasting a basis for cooperative productive effort as is possible of attainment.

Mr. Johnson went on to say that "the right of the industrial executive to leadership over workers is being challenged. American workers are not interested in what they have compared to what workers in a foreign country have, but in what they may have tomorrow compared with what they have today."

Mr. Johnson explained that the committee for which he acted as chairman had prepared a series of bulletins on various problems affecting wages, hours, employee representation, unemployment benefit plans, employee superannuation, unemployment insurance and other topics. He said that the bulletins would be distributed among members of the metal trade, and would be followed up by regional discussions under surveillance of the central committee. He said that trouble in one employer's plant affected the whole community, and group effort should be directed toward dispelling it. "One bad apple can spoil a whole situation in a community."

Leadership Should Offer Mutual Advantages

J. S. Knowlson, chairman, Stewart-Warner Corp., Chicago,

and president of Speedway Mfg. Co., Cicero, Ill., succeeded Mr. Johnson as speaker. Taking for his subject "Management's Responsibility," Mr. Knowlson said he proposed to discuss his topic in its relation to the law of self-preservation. He said a primitive rule, that "man keeps what he's got and gets what he can," is still in force, but that "primitive society early learned the value of 'leadership' because it made life easier." It was shown, however, that the people choose who shall lead them, and discard one choice for another when they feel the change will give them more for their money. "Management must therefore supply a leadership which has mutual advantage."

Quoting one of his colleagues, Mr. Knowlson continued that "if management put as much effort into industrial relationships as into sales, the problem would be solved." He said that "employees' needs are as important as customers' needs," and that in order for management to understand them "foremen must be as thoroughly trained as salesmen."

Reverting to the question of leadership, Mr. Knowlson contended that "management is vulnerable today because its carelessness has upset people's faith in it. In 1917 management said the war would make the world safe for democracy; but did it?" Alluding to historical incident in which ambitious forces have usurped the power of leadership by false promises of greater gifts to the people, Mr. Knowlson said "the song of the more abundant life, being heard on all sides today, is an ominous warning." He then demanded of his listeners whether any of them wanted to see the historical cycle repeat itself.

Speaking of the American industrial system, he said that "in no other civilization have so many leaders risen from the ranks," and that this was sufficient proof that "workers and leaders are the same people and have the same purpose." Recognition of this fact, it was stated, would be the most effective way of meeting the "competition" to industrial management expressed in the activities of New Deal politicians.

"Need for Coordinated Effort"

Adopting the view that "American industry is not an accident," but that "its success has begotten carelessness," Howard W. Dunbar spoke of the "Need For Coordinated Effort." Mr. Dunbar, manager of the grinding machine division of the Norton Co., Worcester, Mass., went on to say that

"loyalty among individuals is a two-sided subject." He declared that the way for management to cultivate it among factory personnel was by opening up avenues of opportunity. He said that "no law compelled Henry Ford to pay his men \$5 a day," that it was "a hard-headed, sensible point of view, not a moral one."

"Presenting opportunity to a man inspires ambition which begets loyalty and devotion." Mr. Dunbar intimated the principle should be put to use. He directed attention to the plant foreman as the link through which management could best effect contact with its workers. "A successful foreman," he said, "is one who safeguards the interests of both parties equally."

Final Goal Is Industrial Efficiency

Louis Ruthenberg, president, Servel, Inc., Evansville, Ind., concluded the report of the Committee on Industrial Cooperation. Under the heading "Direct and Indirect Benefits from the Program," he connected his topic to Mr. Knowlson's "law of self-preservation," and explained that industrial management must react to the stimulus of this law. "In the last analysis we are all motivated by selfishness, but it must be a far-sighted selfishness," he said.

"Management's self-interest in promoting better employer-employee relations," he said, "lies in greater industrial efficiency." This factor also leads to improved "real wages," Mr. Ruthenberg explained. Thus, workers are benefited. He recited experiences of a firm in his knowledge which had placed a co-operative plan in operation. The management of the plant, he said, found that "unit labor costs were reduced, wages rose, output was higher, and that an improved competitive position led to more sales." It was noticed, too, that "interest in union affiliations disappeared, the plant's workers taking the attitude that they were wasting their time and money on the union."

How To Develop Skilled Labor

George A. Seyler, works manager of Lunkenheimer Co., Cincinnati, spoke on the "Need for Skilled Help and How to Meet It." He said that at present "a shortage of skilled help exists because management abolished the apprenticeship system when the depression became acute." He contended that "more emphasis upon reinstatement and perfection of the apprenticeship plan is now needed." As a prior consideration, however, he mentioned the value of vocational development in public

schools. Such a system "eliminates the trial period of vocational adjustment because the novice wants to do what he applies for as an apprentice."

Mr. Seyler described a plan in operation at Cincinnati where "occupational research and vocational counseling have been in progress for eight years." He said that business men in the district were actively cooperating with the board of education in arranging "plant visitations" and in editing useful text-books on technical subjects.

Although the metal trades were said to constitute the largest single industry in Cincinnati, Mr. Seyler explained that other vocations were affording serious competition as to the supply of persons eligible to become apprentices. He singled out public service for special consideration, and said that the present 800,000 employees of the Government might well develop into a permanent condition unless, in some way, a curb could be applied to the Administration's extremism.

Culture Depends On Machine

Exclaiming that "there is ample statistical evidence to show that the use of the machine has given the United States the most marvelous century and a half the world has ever known," Dr. James S. Thomas, president, Clarkson College of Technology, Potsdam, N. Y., undertook to discuss his subject, "What the Machine Has Done to Mankind." Dr. Thomas told of two kinds of culture, "an idealistic culture about which everybody raves and a materialistic culture about which nobody raves." The latter, he said, "does the obviously prosaic job of paying for the idealistic culture." He said he could not understand the literary effusions of the intelligentsia, since the machine was the backbone of our industrial civilization which, in turn, has been directly responsible for putting 29,500,000 young people into our schools and colleges where they are taught idealistic culture by 1,000,000 teachers and professors. In other words, approximately one-fourth of the total population of this country, he stated, are at work on what we call idealistic culture.

He contested the charge that "the machine puts men out of work." Actually it shortens hours of labor, but as regards numbers employed creates more new jobs than it destroys. Elsewhere, Mr. Thomas quoted statistics to show that the machine has steadily increased the wages of labor. "Real wages, or purchasing power in

terms of goods, more than doubled between 1900 and 1935."

There is no such thing as "technological unemployment" as the term is popularly used today, Mr. Thomas said. "On the whole the development of the machine has constantly put more and more men to work. The machine is a creator of jobs because the wants of men are limitless."

What We May Expect from Machine

Similar confidence in the machinery of industry was expressed by J. H. Van Deventer, editor, *THE IRON AGE*, New York. Mr. Van Deventer described technical improvements over the past fourteen years, and on this basis predicted what might be accomplished by 1950 provided industry's research laboratories and staffs can continue in operation. He voiced the fear, however, that the expense of carrying on this type of work might prove too great a burden in the future if, as now seems likely, surplus earnings of corporations are to be wholly consumed by taxation. The speaker pointed out that many large industrial organizations operate research laboratories solely to develop and perfect new mechanical devices and processes, but that such expenses have to be defrayed out of surplus as these institutions are not run for profit.

Failure of Wagner Act

"If any proof of the failure of the Wagner act were needed, it can be found in the recent appearance of members of the National Labor Relations Board before the LaFollette subcommittee of the senate, where they presented various alibis and excuses for the failure of the act, and, as was expected, laid upon employers the blame for an inevitable situation." Thus did John Gall, associate counsel for the National Association of Manufacturers, characterize the unsound labor policy inculcated in a popular example of New Deal legislation. Mr. Gall, addressing the convention on "Current Legislation and Litigation Affecting Employers," singled out the National Labor Relations Act, commonly known as the Wagner act, for special comment. "Based on false premises and aimed at one party to the employment relationship alone, the Wagner act never held any possibilities except for promoting discord. Its failure is now clear to all except its sponsors and those who are paid to administer it."

Mr. Gall went on to say that the Government's policy of loading the cost of social measures directly on

employers through increased taxation was bad, but not so bad as the unsound labor policy consciously pursued by the Administration. In addition to the Wagner act, he spoke of a number of other proposals now pending in Congress, and designed to promote further regulation of the employment relationships. Among these measures, the so-called Walsh Government contract bill, the O'Mahoney licensing bill, the Black 30-hr.

Officers and Councilors National Metal Trades Association

Charles H. Strawbridge, Goodman Mfg. Co., Chicago . . . President
N. W. Pickering, Farrell-Birmingham Co., Inc., Ansonia, Conn.,
First Vice-President
A. H. Timmerman, Wagner Electric Corp., St. Louis,
Second Vice-President
Harold C. Smith, Illinois Tool Works, Chicago . . . Treasurer

Councilors elected for two years:
Alexander Sellers, Wm. Sellers & Co., Inc., Philadelphia
R. W. Gillispie, Jeffrey Mfg. Co., Columbus
George A. Seyler, Lunkenheimer Co., Cincinnati
Harold S. Falk, Falk Corp., Milwaukee
D. F. O'Brien, A. P. Smith Mfg. Co., East Orange, N. J.
Lou's Ruthenberg, Servel, Inc., Evansville, Ind.

week bill, the Ellenbogen bill and the Van Nuys bill, were cited.

Considered in their relation to one another and in connection with recent remarks made by the Administration, Mr. Gall stated that it was obvious that "what is contemplated by the forces behind the measures is revival of the substance of NRA." Together with the Wagner act and the Guffey coal act, they would represent an effective piece-meal re-enactment of the National Industrial Recovery Act.

M. Albert Linton, president, Provident Mutual Life Insurance Co. of Philadelphia, undertook a partial analysis of certain phases of the social security enactment. Mr. Linton admitted he was handicapped, however, as the ponderousness and complexity of the task before him prohibited a very thorough examination of the subject. "But of one thing," he said, "we may be certain. The taxes called for by the Social Security act mount up to huge figures."

Mr. Gall affirmed that it was difficult to see how Congress was going to administer the act in its present complex form. He gave as his opinion that "despite extensive hearings by House and Senate Committees, Congress, busily engaged in putting through other far-reaching and difficult pieces of legislation, did not have time to inform itself adequately regarding the intricate subject of social insurance." He also warned that serious danger existed as to the practicability of the investment features of the plan. According to estimates of the Senate Finance Committee, the Old Age Reserve Account, provided for under the law, will reach approximately \$47,000,000,000 by 1980, all of which will be represented by investment in direct or fully guaranteed obligations of the United States.

Asserting that he has read French, Spanish and English tax laws in French, Spanish and English, and that, in addition, he has read every revenue act of this country since 1909, Henry B. Fernald, senior partner of the accounting firm of Loomis, Suffern & Fernald, New York, went on to say that he has not yet read any law so unintelligible as the present creation of Congress. Mr. Fernald addressed the meeting on "The Present Federal Tax Program," but stated at the outset that he could hardly be expected to know what he was talking about. He said that reading the new law produces an effect analogous to that produced on Alice when, after listening patiently to a recitation by an odd inhabitant of Wonderland, she remarked, "it seems to fill my head with ideas, only I don't know what they are."

Mr. Fernald contented himself and his listeners with a partial explanation of some of the effects of the law. According to estimates, the bill will yield \$620,000,000 additional revenue annually when it comes into full operation. The speaker showed how industrial corporations would be compelled to supply the bulk of this total, while banks and trust companies and domestic corporations in receivership would escape with a "flat" tax of 15 per cent. He stated that if a business head should set aside \$10,000 of his company's income to buy a necessary piece of machinery, then, under the terms of the law, it was entirely possible the company might be charged an additional \$10,000 as a penalty tax.

The effect of the bankruptcy provision in the enactment, Mr. Fernald explained, may possibly be to drive hundreds of corporations into receivership.

Electrochemists Review Action of Inhibitors

New Anodic Pickling Method — Antimony Chloride for Selective Inhibition

AN imposing array of members and guests registered in Cincinnati last week for the sixty-ninth general meeting of the Electrochemical Society, Inc. Assembling for the first time in Cincinnati, members were presented with an unusually crowded program, including the presentation of about 43 manuscripts, several inspection trips and a broad social program.

On Thursday afternoon, members and guests were entertained at the Middletown, Ohio, plant of the American Rolling Mill Co., and in the evening the able physicist, Dr. Karl K. Darrow, of Bell Telephone Laboratories, Inc., delivered a lecture entitled "Electricity in Gases." On Friday the scientific-technical sessions were devoted to batteries, electro-organic chemistry and allied subjects, and, in the evening, President James H. Critchett, of the Electrometallurgical Co., delivered an address dealing with the metallurgy of columbium. Saturday was devoted to electronics and a number of theoretical papers on electro-deposition.

The Thursday morning session on inhibitors was of particular interest to the steel fraternity. One paper in this group entitled "Anodic Pickling of Iron and Steel," was offered by R. Müller and L. Harant of the University of Leoben, Steiermark, Austria. These two men pointed out that pickling of iron and steel on a large scale is usually done in solutions of hydrochloric acid or sulphuric acid to which some organic inhibitor is added to prevent or minimize embrittlement of the steel due to the diffusion of atomic hydrogen into the surface of the metal. In electrolytic pickling, when the work to be cleaned is made the anode, most metals dissolve. However, there is no hydrogen developed at the metal surface as in the case of cathodic pickling. Furthermore, in anodic pickling the rate of pickling can be controlled within wide limits through

current regulation. There is no danger of hydrogen embrittlement, the pickling solution need not be an acid, and an acidified salt solution will work satisfactorily. In the case of such ferrous metals which readily become passive if treated anodically, the loss of metal is not significant. Furthermore, an electrolytically pickled metal will be more resistant to rusting than if it were simply acid pickled without current.

In their experiments, the authors used iron wires and small sheets of iron and plain carbon steel as "work." The laboratory data disclosed little difference in the behavior of iron and steel. The sheet metal samples were suspended between two parallel cathode sheets, and, in the case of wire, the cathode was in the shape of a sheet metal cylinder, the wire being suspended in the axis.

The experiments were carried out with solutions of neutral salts (NaCl , Na_2SO_4) and with acidified solutions of these neutral salts. Of the salts investigated, ferrosulfate acts as a depolarizer and counteracts the passivity of the iron which retards pickling. The FeSO_4 solutions which were used varied from 1 to 0.05 N and were acidified with H_2SO_4 up to 1 per cent. The good pickling results with the ferrosulfate solutions were judged by the authors as being of considerable practical importance inasmuch as these solutions are very cheap.

Anodic Pickling Cheap

The authors also studied electrolytic pickling by using concentrated solutions of FeSO_4 and determining the loss in weight of the work pickled. They found that the action is relatively slow during the first two or three minutes of the pickling period after which there is a distinct acceleration of the rate. This is probably due to the fact that the surface to be pickled is at first completely covered with a nearly insoluble layer of scale which subsequently becomes loosened and

drops off as the electrolyte penetrates to the metal surface.

It was pointed out that the anodic pickling action involves primarily not a dissolution of the scale, which like most oxides is very difficult to dissolve, but rather a loosening of the scale due to the penetration of the electrolyte to the underlying metal surface and the subsequent evolution of oxygen which causes the loosening and precipitation of pieces of scale. This mechanical action of the anodic gas likewise accounts for the greater difficulty in pickling stainless alloys, as compared with ordinary iron, for in these alloys the scale adheres very tenaciously.

Using an electrolyte of 0.5 N FeSO_4 acidified with 0.1 per cent H_2SO_4 , the authors found that pickling time is almost independent of the current density when low current densities are used. For instance, a density of 8 amp. per sq. ft. requires practically the same time as a current of 36 amp. per sq. ft. Likewise, the loss in weight of the work (anode) is nearly independent of the current density. It increases but little with rising current density. The anode current density, therefore, drops with rising current density, or, in other words, increasing the current density increases the pickling cost.

In several experiments the authors superimposed alternating current onto the direct current. It was found that alternating current has no accelerating effect, but rather a retarding effect on the pickling process. Furthermore, the anodic loss of metal increases.

It was also determined that a 0.5 N ferrosulfate plus 0.01 per cent H_2SO_4 solution performed better than a 10 per cent H_2SO_4 solution.

It was found that when pickling at low current densities the process proceeds more slowly and at the same time comparatively large amounts of metallic iron go into solution. Accordingly, at first sight it appears that pickling at high

current densities is the better procedure. However, when current consumption per unit area pickled at different current densities is compared, the opposite conclusion is arrived at. Therefore, when all the costs were compared, the authors concluded that the use of low current densities in the anodic process is preferable in spite of the greater metal losses.

In comparing costs, the authors stated that large scale pickling without current costs for acid and organic inhibitors about 0.03c. per sq. ft. of iron pickled. The total cost of the new anodic process is about 0.06c. per sq. ft. However, since there is no electrolyte renewal in the latter process, they concluded that the new anodic procedure would be more economical in the end.

For efficient and economical pickling, the authors recommended the following: current density of about 4.6 to 9.3 amp. per sq. ft.; electrolyte made up of about 0.4 N FeSO_4 plus 0.1 to 0.5 per cent H_2SO_4 ; temperature around 77 to 95 deg. F.; a pickling time of about 30 min.; and the use of two iron cathodes for each anode.

Selective Inhibitors

A paper presented by S. G. Clarke, of Woolwich, England, reviewed the use of inhibitors in the selective removal of metallic coatings and rust. He pointed out that inhibitors of the type represented by *quinoline* restrain the action of hydrochloric acid on a wide variety of metals, while *antimony chloride* is selective in its action. The latter powerfully restrains the action of the strong acid on iron, nickel and cobalt, but markedly accelerates the dissolution of zinc, cadmium, tin and chromium.

The author pointed out that this behavior may be made the basis of methods of removing quantitatively metals of the last mentioned group when present as coatings on metals of the first group. Copper and brass show slightly greater attack in hydrochloric acid-antimony chloride solution than in hydrochloric acid alone. However, as the attack is slow, copper and brass may be included with metals of the first group for this practical application.

Mr. Clarke stated that published processes in which antimony has been utilized as an inhibitor have so far been described for zinc, cadmium and tin as coating metals on iron and steel. The restraining action of antimony in hydrochloric acid solution extends to low and high-carbon steel, chromium steels, wrought iron, and to a certain extent, cast iron. The rate of attack on electrodeposited zinc and cadmium varies with the conditions

under which the metals were deposited. The inhibiting action of antimony in hydrochloric acid is associated in the case of iron and probably also with other metals of similar electrochemical character with the formation of a film of antimony, which, while cathodic to the metal, produces a surface of relatively high hydrogen overvoltage which renders difficult the evolution of hydrogen. With zinc, cadmium, tin and chromium, the stimulation of attack may be caused by the deposited antimony facilitating hydrogen evolution by reason of the high e. m. f. of the antimony, metal couples and the relatively lower hydrogen overvoltages of the cathodes. Antimony only inhibits the solution of iron in relatively concentrated hydrochloric acid. In dilute hydrochloric or sulfuric acid, antimony deposits in a spongy, non-protective form.

Hydrochloric acid can be used for quantitative removal of rust provided there are present substances to prevent attack on the metal. Antimony chloride is a suitable inhibitor and stannous chloride should also be present to reduce ferric chloride, which has a corrosive effect. The solution, used with vigorous agitation to increase the speed of rust removal and also to ensure adequate distribution of stannous chloride for reducing purposes, is rapid in action and effective.

In various corrosion investigations, it is often desirable to completely remove films or coatings and leave the underlying metal unattacked. In the case of a corrosion product, this removal is often necessary to allow the metal surface to be readily examined for effects of corrosion, depth of pitting, etc., or to permit the amount of corrosion to be assessed by weight. With a metallic layer present as a protective coating, quantitative removal provides a means of determining the average thickness. The use of an acid for dissolving the coating may be allowable provided a suitable inhibitor is available to prevent attack on the basis metal.

The object of Mr. Clarke's experiments was to determine the action of antimony as an inhibitor in this respect.

Numerous substances have been found to restrain or practically inhibit the solvent effect of acids on iron and steel, but less information is available in regard to other metals. Mr. Clarke arbitrarily divided inhibitors into two classes: (1) inorganic materials, e. g., arsenic and antimony compounds; (2) organic materials, e. g., cyclic amino compounds. One example from each class was selected and its effect on the attack of a number of the commoner metals by strong

hydrochloric acid was tested. The results of these tests showed that while *antimony* markedly restrained the action of hydrochloric acid on iron, nickel and cobalt, it considerably accelerated the solution of chromium, cadmium, tin and zinc. *Quinoline*, on the other hand, restrained the action in all cases, although it appeared to be slightly inferior to antimony in protecting iron, cobalt and nickel. Thus while a general type of restrainer like *quinoline* is likely to have little applicability in the selective removal of metallic coatings, antimony offers many possibilities.

The inhibiting effect of antimony toward iron in hydrochloric acid has been known for some time. Subsequently, a method along similar lines was advocated for testing the weight of electrodeposited cadmium coatings on steel. This method has been found satisfactory for stripping electrodeposited zinc coatings and also, Mr. Clarke has just recently described the application of this method for stripping tin coatings.

A feature of these processes is the rapidity with which the coating metal can be dissolved off and its amount determined by loss in weight. The technique is very simple and consists in immersing the test piece in strong hydrochloric acid containing some antimony trichloride (about 2 per cent) at room temperature. The coating metal dissolves within a minute or so, depending on its thickness, with vigorous evolution of hydrogen, and the end of the solution process is marked by a cessation of gassing. Some antimony is deposited on the basis metal in a non-adherent state and can be readily removed by rubbing with a mop under water.

Furthermore, Mr. Clarke pointed out that the scope of these methods may be extended to cover chromium as coating metal and nickel and cobalt as basis metals.

Further tests by Mr. Clarke showed that the effect of hydrochloric solution on copper and brass was somewhat greater than that of hydrochloric acid alone. It would, however, appear safe to use antimony trichloride to accelerate the removal of the above-mentioned metals from copper and brass, as the attack on these basis metals would be slight during the short time involved.

Stripping Alloy Layers

The application of acid-antimony chloride solutions to coatings such as hot-dipped coatings requires consideration of the effect on the underlying alloy layer, according to Mr. Clarke. In the case of hot-dipped tin coatings, the tin-iron alloy layer is almost completely dissolved

by the hydrochloric acid - antimony chloride solution, the attack on the basis steel being negligible. In employing the solution to ascertain the total weight of tin per unit area, a correction for the iron constituent amounting to one-third of the alloyed tin has been found necessary. The correction is usually a minor one. Thus with ordinary medium-grade tinplate having a total of, say, 32 oz. of tin per base box, the appropriate correction of 1 oz. per base box represents only about 3 per cent of the whole.

In the case of zinc, however, tests have shown that the amount of zinc removed by the hydrochloric acid-antimony chloride solution is in general somewhat greater than the amount of zinc actually applied to the sheets in manufacture. It is therefore customary to refer to the values obtained as weight of coating rather than weight of zinc.

Toward the end of his paper, Mr. Clarke showed that hydrochloric acid is an effective solvent for rust, and it may be used for quantitative de-rusting of steel if there is present (1) a suitable inhibitor to prevent attack on the steel at pores or denuded areas in the rust coating, and (2) a reducing agent to reduce ferric chloride formed by the dissolving rust. A method has been devised in which the rusted steel is immersed in a vigorously stirred solution of the following composition: 100 parts of concentrated hydrochloric acid, 2 parts of antimony oxide (Sb_2O_3), and 5 parts of stannous chloride crystals. The proportions of antimony oxide and stannous chloride allow of fairly wide variations without detriment. The rust dissolves off rapidly, leaving clean steel which may be washed in water and dried for examination or weighing.

In a typical case, de-rusting with the above solution of steel pieces which had been exposed outdoors in an industrial atmosphere for periods of one month and one year, was complete in 2 min. and 20 min. respectively. For purposes of comparison, similar rusted specimens were treated for de-rusting by making them cathode in potassium cyanide solution, but they remained incompletely de-rusted after a period of several hours.

The necessity for removing ferric chloride formed by the solution of rust was found to be important, as otherwise appreciable attack on the steel resulted. Stannous chloride was a suitable agent to reduce the ferric chloride, changing it into ferrous chloride which appeared to be without effect. Vigorous agitation of the liquid, preferably by mechanical means, increases the

speed of rust-removal, and is essential in order to bring up supplies of stannous chloride from the bulk of the solution to reduce ferric chloride as fast as it is formed, thus preventing local accumulation at the surface of the specimens.

Dangerous Inhibition

A manuscript entitled "Safe and Dangerous Inhibitors" was presented by Ulik R. Evans, of Cambridge University, England. Of interest was the author's recapitulation of views on the electrochemical mechanism of corrosion.

The behavior of iron in a salt solution is slightly more complicated, because the ferrous hydroxide formed from the cathodic product (sodium hydroxide) and the anodic product (ferrous chloride) interacts with further oxygen to give a ferrous-ferric oxide (black rust) or, in excess of oxygen, hydrated ferric oxide (brown rust). Oxygen, therefore, promotes rusting in two ways. First, acting as a cathodic depolarizer, oxygen stimulates the flow of current, and, secondly, it converts ferrous hydroxide to less soluble bodies. The rusting process may be regarded as an indirect electrochemical oxidation leading to oxide, usually in a hydrated form at a place or in a condition where it is unlikely to stifle the reaction.

It was stated further that the only reason why at low temperatures electrochemical corrosion is important and direct oxidation unimportant, is that electrochemical reactions usually lead to direct corrosion-products which are soluble. Thus stifling is avoided. Sparingly soluble products (such as rust) which arise from secondary reactions will not cause stifling. However, where electrochemical action leads to direct products which are sparingly soluble, stifling may be brought about. This latter fact should be carefully noted, because there are many salts, such as sodium phosphate, which inhibit corrosion mainly because they lead to a sparingly soluble body (e.g., a metallic phosphate) formed as the primary anodic product in physical contact with the metal, so as to stifle the attack.

Mr. Evans continued by pointing out that although anodic and cathodic reactions must occur at the same rate, it often happens that the pace is set by one of these reactions almost exclusively. He presented the following analogy to demonstrate his point. If water is flowing through a long pipe, one section of which is very much narrower than the other, the volume of water passing any given point on the broad part in each minute must be equal to that passing a point on

the narrow portion. Yet it is the narrow portion which will determine the rate of flow. Any slight extra blockage in the narrow portion (or bottle neck) will considerably decrease the flow, whereas a similar small reduction of cross-section of the wide part will not appreciably affect it. Similarly, in the corrosion of iron immersed in a salt solution, the rate of corrosion is often fixed by the rate of reaction of oxygen as a cathodic depolarizer. In this case the cathodic reaction controls the rate of corrosion, and the concentrations of (simple) anions affect it but little, except insofar as they alter the oxygen solubility. But if stainless steel or aluminum is considered, the state of affairs is different. Here a protective skin covers the greater part of the surface, and the approaches to the anodic points (the places where the film is defective) constitute the bottle necks of the circuits. Thus an increase in the oxygen supply does not seriously stimulate corrosion. By repairing the film it may sometimes tend to decrease it. On the other hand any increase of supply of penetrating anions (e.g., Cl^- ions), which increase the number of places where the anodic reaction can occur, will increase the rate of attack. But cases where one reaction exercises sole control are by no means universal—indeed "mixed control" is probably more usual.

The author subsequently classified inhibitors into (A) anodic inhibitors which tend to suppress the anodic reaction (e.g., hydroxides, phosphates or silicates which form sparingly soluble compounds with the metal), and (B) cathodic inhibitors, which tend to suppress the cathodic reaction (e.g., zinc or magnesium salts, which often precipitate a hydroxide on the normally cathodic surface, either poisoning the catalytically active points or alternatively screening them from oxygen—the cathodic depolarizer). Evidently, therefore, it is necessary to consider four different combinations: (1) Anodic control-anodic inhibitor; (2) anodic control-cathodic inhibitor; (3) cathodic control-anodic inhibitor; and (4) cathodic control-cathodic inhibitor. There are intermediate cases where the control is "mixed," but these four extreme cases were used to demonstrate the subject.

The author discussed specific reactions in each of the four cases and showed that cases (1), (2) and (4) may be considered safe whereas (3) is a dangerous procedure. Considerable detail was involved in demonstrating these contentions, and any abstraction would necessarily be too sketchy to do much good.

Iron and Steel Engineers Discuss New Developments in Steel Making and Rolling

MANY of those unfamiliar with the design and operation of the new circular ingot heating furnace were greatly enlightened by a highly interesting discussion, with moving pictures, presented by M. H. Mawhinney, consultant of the Salem Engineering Co., Salem, Ohio, at the annual spring conference of the Association of Iron and Steel Electrical Engineers held last week in Youngstown.

A feature of this gathering, which totaled approximately 800 iron and steel engineers and guests, incidentally the greatest number ever attending such a conference since the beginning of the association, was an inspection trip to the Carnegie-Illinois Steel Corp.'s hot strip mill at McDonald, Ohio. A description of the 43-in. hot strip mill by L. N. McDonald, general superintendent of the Carnegie-Illinois Steel Corp., Youngstown, illustrated with a moving picture, preceded the inspection trip to the mill.

The important question of descaling hot steel was adequately covered in an address by J. E. Holveck, sales engineer, Worthington Pump & Machinery Corp., while another paper by M. Stone, engineer for the United Engineering & Foundry Co., went into detail on the control and recording of rolling mill pressures.

During the morning session, the general chairman, H. J. Baugh, assistant general superintendent in charge of production, Carnegie-Illinois Steel Corp., Youngstown, told the gathering that the executive committee of the association had under advisement the question of changing the name of the group to the Association of Iron and Steel Engineers, dropping the "Electrical," inasmuch as over the past several years the association has covered a great number of subjects not necessarily restricted to the electrical field. While this question has not been definitely settled,

it appears that the name will be changed.

Circular Furnace for Ingot Heating

Mr. Mawhinney in his talk on circular furnaces for ingot heating, went into the history of soaking pits saying that the original idea for a furnace of the type described by him was the result of experiences with those in use for



M. H. MAWHINNEY

the treatment of finished steel. Working from this point, engineers figured that if good results were obtained in the finished product, there seemed to be no reason why the same scientific procedure could not be applied to the treatment of ingots. According to Mr. Mawhinney, treatment in the heating of ingots certainly can be carried out along scientific lines, with a maximum benefit being derived. The circular furnace described is nothing more or less than a round soaking pit, but having such important features as controlled heat and atmosphere.

Another modern development described by the speaker involved the

construction of the opening at the top. On some of the older rectangular soaking pits, the tops were subject to quite a lot of warping, with the result that not only the heat escaped, but in many cases air was allowed in, resulting in excessive scaling. Also a tight fit was not always obtained. In the new circular furnace the top is round, made of extremely heavy metal, is not subject to warping, and furthermore, said Mr. Mawhinney, when in place a sand seal prevents the escape of heat and the entrance of excessive air, since this type of furnace is not only controlled for heat, but also for atmospheric conditions. The movement of the top is fairly simple. It moves upward, opening the seal and then slides back far enough to allow either charging or drawing.

F. E. Leahy, fuel engineer of the Youngstown Sheet & Tube Co., during the discussion of this type of furnace, stated that his company had put one of them in, and it had come up to all expectations. One of the things which interested him very much was the ability to heat cold steel continually without difficulty. Incidentally, he said that the time required to heat thoroughly cold ingots ran from about 8½ to 9 hr., while hot steel could be brought up to the desired soaking point in about 4 hr. His company is also carrying out some experiments in the use of oil versus coke oven gas.

These circular furnaces, according to Mr. Mawhinney, are built in two sizes—one 11 ft. in diameter at the charging hole, and the other 16 ft. in diameter, with twice the charging capacity of the smaller pit. To express the magnitude in tons, one of these larger furnaces has loaded as high as 100 tons of steel at one charge.

Answering a question as to how much the scale loss was reduced, Mr. Mawhinney said that experience has shown that the scale loss

is approximately cut in half by the use of this type of furnace.

Descaling Hot Steel Hydraulically

Very interesting to the gathering, since they were able later on in the day to see its operation, was a description of the method used in descaling hot steel hydraulically.



J. E. HOLVECK

J. E. Holveck gave a detailed account of the nozzle and auxiliary parts used in the descaling operation. While primarily used in the manufacture of sheet and strip, the benefits from this process have been so satisfactory that the descaling is being applied to other products, such as sheet bar, plate, merchant bar and seamless tubing. Practically all descaling requirements, continued Mr. Holveck, have the same variable water demand characteristics. There may be a few cases where the water demand is constant, but these are an exception. In the paper delivered, hydraulic descaling and methods for determining satisfactory equipment for a wide continuous hot strip mill were covered. The variable characteristic of water demand is met with either a centrifugal or reciprocating type of pump with an accumulator.

Both the speaker and some of the steel men present were of the opinion that the accumulator was a very important part of the equipment, since it not only enabled the selection of a smaller pump, but also provided for a system which maintains a much more uniform pressure. According to the speaker, the hydro-pneumatic type of accumulator has been found most suitable for this purpose. The nozzles in the hydraulic descaling method are arranged so that the spray of water hits the hot steel at about an angle of 90 deg., with sprays overlapping each other to such an extent that the steel is

completely covered, thereby tending toward a more uniform finish. Incidentally this water driven at a 1000-lb. pressure is directed both at the top and the bottom of the hot metal.

Considerable interest was evinced at some figures produced by Mr. Holveck, showing that the use of a stopper or cap attachment for those nozzles not needed in the descaling operation, due to smaller widths, made a considerable saving in pump and water costs.

During the discussion, H. B. Mann of the Dravo-Doyle Co., mentioned a case where 1525 gal. of water per min. were being used, whereas if caps had been provided on the sprays not necessary in the operation, only 1125 gal. would have been used, resulting in a saving of 400 gal. per min. He seemed to think that in terms of pumps, motors and electricity, monetary



M. STONE

savings would have resulted in close to \$10,000.

Controlling Roll Pressure

The history of controlling roll pressure has been replete with attempts to get this most important item down to a scientific basis. One of the methods used consisted of a steel block machined to very true measurements, combined with a strain gage, and while proving satisfactory in the absence of anything better, nevertheless, was far from what was really desired.

M. Stone of the United Engineering & Foundry Co. described the method advocated by his company. A roll pressure meter has been developed which utilizes the strain in the housing posts to indicate the magnitude of the rolling load. He said that by the proper adaptation of an electro magnetic strain gage embedded in the housing, both remote indication and recording of rolling mill loads have

been worked out to a practical success. At the present time about a dozen mills have been equipped with such apparatus. The principle involved is not only interesting but is unique in that one does not realize how much the housing posts elongate during high pressures exerted during the rolling process. This feature was brought home by the illustration of a housing both before and after the application of pressure. The apparatus for measuring this roll pressure is not very complicated, and may be installed either on new mill equipment or on housing posts already in operation. Proper calibration enables the instrument to signify when safe pressures are being used. According to Mr. Stone, there is no attempt to use this roll pressure meter as a means to determine the gage of the steel. This is left entirely to the roller. The main purpose is to prevent overloading.

Optomatic Pyrometer Described

Equally interesting, and carrying out the spirit of the association's desire to discuss late and modern developments along lines interesting to its members were three other papers covering the following questions: "The Measuring of the Temperature of Moving Objects," by A. E. Krogh, sales engineer, Brown Instrument Co.; "Modern Refractories in the Steel Industry," by L. J. Trostel, chief



A. E. KROGH

chemist, General Refractories Co., and "Tension Control in Cold Strip Rolling," by F. Mohler, industrial engineer, General Electric Co.

Mr. Krogh described in detail the optomatic pyrometer. This instrument, involving the use of the photo-electric cells, automatically records temperatures of fast moving objects. In fact, it indicates or
(CONCLUDED ON PAGE 98)

Automotive Engineers' Production Meeting Combines Plant Visits with Technical Sessions

SOME 600 production engineers of the automotive industry assembled in Detroit April 21 for the four-day sessions held under the auspices of the National Production Activity of the Society of Automotive Engineers. A feature of the meeting was the fact that several sessions were held at plants where the operations described in the papers were being carried on.

Papers were distinguished by the wealth of specific information they contained, particularly with reference to speeds, feeds, and output per unit per hr. K. L. Hermann, vice-president of the S.A.E. and consulting engineer of the Bantam Ball Bearing Co., was in charge of the program and presided at the opening session, which was devoted to cast crankshafts and camshafts.

Casting and Machining Ford V-8 Crankshafts

W. F. Pioch of the Ford Motor Co., in discussing the development of the Ford V-8 cast steel crankshaft, began by describing the construction of the 16 core boxes of dry baked sand which composes the stack mold for casting four cranks at a time in vertical position. An interesting fact brought out was that the top and bottom sets of core boxes have angular corrections so that when the casting cools the cheeks are at 90 deg. to the axis of the crankshaft. No correction is needed for the two center pin bearings. Wear limit on the core boxes has been established at 0.007 in. in order to prevent cumulative errors which would hinder later manufacture.

The metal used for these crankshafts has the following analysis:

Chromium	0.40 to 0.50
Silicon	0.85 to 1.10
Manganese	0.60 to 0.80
Carbon	1.35 to 1.60
Copper	1.50 to 2.00
Phosphorus	0.10 Maximum
Sulphur	0.06 Maximum

It is melted from borings, malleable iron scrap, basic pig iron, carbon steel trimmings, alloy steel billet ends, gates and risers, plus some copper, in four 15-ton electric furnaces rated at 5000 kva. The

metal leaves the furnace at 2800 deg. F. and is poured at 2700 deg.

One of the greatest factors in producing the desired physical properties, which run up to 130,000 lb. ultimate strength and 96,500 lb. elastic limit and a Brinell hardness between 255 and 321, is that of normalizing and heat-treating. Shafts are brought up to 1650 deg. F. in one hour, held at this temperature for 20 min., reduced to 1000 deg. F. in air, then reheated to 1400 deg. in an hour and held there for one hour, finally being discharged from the furnace at 1000 deg.

Many traditional machining methods have been altered. Cutting speeds on turning operations have been reduced by as much as 55 per cent over those used for forged steel, although the feed has been maintained at a high point to prevent the tools from glazing. A number of carbide tools have been tried out, but the most successful results have been obtained with special hammered high-speed steels such as Rex AAA. A number of cutting oils have been tried without much success, and today soda water solution is used exclusively, but merely as a coolant.

Because the crankshaft is cast much closer to size than the original forging, the stock removed by machining has been reduced from 15 to 9½ lb. The machining time has been reduced from 39 to 34 min. and the grinding time from 44½ to 29½ min. Elimination of all straightening operations has contributed largely to these savings. The cast shaft has a fatigue resistance double that of the forged type. It has much better wear resistance because it contains a certain amount of free graphite which tends to create a self-lubricating condition.

Development of Proferall Cast Camshafts

B. J. Vail of the Campbell, Wyant & Cannon Foundry Co. described the early history and present development of alloy cast iron camshafts now used by about 25 engine manufacturers. The metal is a duplexed electric furnace alloy iron known to the trade as "Pro-

ferall" (processed ferrous alloy iron). The metal charged in the cupola consists of grade A scrap and selected pig iron, together with chromium briquettes. The melted metal is tapped at approximately 2800 deg. F. and is transferred to an electric furnace where nickel and molybdenum are added. After the refining and superheating the metal leaves the furnace with the following analysis:

Total Carbon	3.10-3.40
Silicon	2.10-2.40
Sulphur	0.10 max.
Phosphorus	0.20 max.
Manganese	0.50-0.75
Chromium	0.75-1.00
Nickel	0.20-0.40
Molybdenum	0.40-0.60

The average camshaft has a Brinell hardness of 262-293 as cast. The hardness factor enters chiefly in the question of gear wear as the usual camshaft has one or two gears cut integral with the shaft. It has been found that the cast iron gear in the camshaft wears best when operating in connection with another gear of like material rather than of hardened steel. Wear of the bearings themselves are better than steel shafts.

Proferall camshafts are cast with an allowance of 1/16 in. finish of bearings for the rough turn and finish grinds. Cams and eccentric faces have 1/32-in. allowance on the radius for rough and finish grind only. There is no finish allowed on the sides of the bearings or cams and in most designs there is no finish left on the ends of shafts. Camshafts are molded much like any other casting of the same size or dimension and are poured on power conveyors where they are left in the mold for about 45 min. before being shaken out. When cooled, the shafts are given an impact test and are straightened if necessary. To perform this operation the shafts, mounted on centers, are sprung by means of a bar and peened slightly at the opposite side from the bar to hold in place. Peening is necessary due to the fact that the elastic limit is close to the ultimate strength of this material.

Some of the savings that ac-

crue over forged camshafts is the fact that patterns can be made at much less cost than forged dies and heat-treating, copper plating, carburizing and hardening are eliminated in hardening the cam surfaces. The additional finish required on a rough forging is unnecessary and the cams can be cleaned up with merely a grinding operation without a previous rough turning. Local heat-treatment is required on the cast camshaft cams to harden the noses, but this is much simpler than the process required on a forging.

Machining Diesel Engine Crankshafts

Anker K. Anton of Fairbanks, Morse & Co. presented a brief paper on the machining operations of an 8-throw crankshaft with 8-in. journals and 6 $\frac{3}{4}$ -in. diameter crank pins. All the crank pins are cored out and the crankshaft in the rough weighs approximately 1300 lb. with only 250 lb. of stock to be removed by machining. On a forged shaft of this size the amount of stock to be removed by machining will be approximately 2000 lb. owing to the fact that this would have to be a hand-forged job. The casting is made from an alloy containing manganese, nickel, and molybdenum having a minimum tensile strength of 52,000 lb. per sq. in. and a hardness from 269 to 325 Brinell. Great savings are possible in the machining operations. The disadvantage of the cast crankshaft is that it is difficult to detect imperfections, such as blow holes. It was suggested that X-ray inspection be made at the foundry.

In a discussion paper, R. E. W. Harrison, vice-president, Chambersburg Engineering Co., challenged some of these casting techniques as against forging practice. His chief point was that the present comparison on the basis of quality and cost is not fair, since a recent survey had shown that 85 per cent of all forging equipment is more than 10 years old. With modern forging equipment, Mr. Harrison contended that the size and shape of a forging could be just as closely controlled as with a casting, so that subsequent savings in machining cost would be identical.

Symposium on Balancing

Three papers were presented relating to production balancing practice. Ewald J. Wolff and Lawrence F. Hope of General Motors Research Laboratories described the types of machines now used in General Motors plants for dynamic, mass-center and static balancing. All the machines use

the same system of measuring unbalance. The assembly to be balanced is supported vertically and is free to move within certain limits on two-roller arm plates, top and bottom. The runout at the rollers caused by unbalance is recorded by a light ray indicator which projects a beam on a screen in the form of a sine wave. When balance is achieved, the wave becomes a straight line. Positions of the peak points of the wave on the chart correspond to a definite amount and location of unbalance on the shaft and by means of charts the required correction can be read off at once. Limits obtainable on these machines range between $\frac{1}{4}$ and $\frac{1}{2}$ oz.-in.

Similar to the balancing machine is a horizontal mass centering machine which is used to locate the center of mass of a crankshaft prior to machining operations. Such a machine reduces rejections of finished shafts due to excessive unbalance, failure to clean up bearings uniformly and similar faults. Operation is entirely automatic.

B. E. Ohlson of the Tinius Olsen Testing Machine Co. described his company's equipment for measuring static and dynamic unbalance. The Olsen-Lundgren electric spark dynamic balancing machine was explained in considerable detail. In this machine the angular position of unbalance is read through a rotating sparking device and the amount is determined through an adjustable compensating unbalance located in the driving headstock. Charts simplify the compilation of unbalance in terms of the amount of metal to be removed by a drill. For balancing generator armatures of supercharger impellers the Olsen vibro-electric dynamic balancing machine was described. In this apparatus unbalance causes vibration of the carriage on which are mounted permanent magnets passing through coils. The voltage induced in these coils is proportional to the amplitude of vibration, which in turn is proportional to the amount of unbalance and can be read directly on a dial. The phase of the voltage depends upon the angular position of the unbalance and this can be read by means of an adjustable brush holder used to achieve rectification of the a.c. current generated.

A new type of machine is being brought out by the company to determine the amount of static unbalance by means of centrifugal forces. This machine has a vibrating cradle supported on flexible springs in a vertical position. The cradle carries a spindle rotated

through a universal joint drive and unbalance is determined by the vibrating electric principle such as is used in dynamic balancing, but for one place of correction only. This machine is more sensitive than previous types made by the company. It is faster to operate, and will partially correct for any centrifugal force couple that might exist. In balancing fan assemblies this equipment can take into account and measure the aerodynamic effect of the fan blades as well as unbalancing weight distribution.

Riding comfort in an automobile today is largely the outcome of regulating the unbalance problem, according to S. T. Foresman of the Chrysler Corp. Although it is possible for accumulated errors to throw an engine out of balance as much as 9 in.-oz., the comfort range is below 2 in.-oz. While individual parts may be balanced within $\frac{1}{2}$ in.-oz., eccentricities in assembly will produce unbalances that are rather difficult to avoid. There are two ways to reduce this unbalance: Tighten up on the tolerances or reduce the weight of moving parts. The crankshaft is the most difficult part of the engine to balance. When working to a limit of 0.25 in.-oz. dynamic balance, it is necessary to remove metal to within 1/10 oz. at a 2 $\frac{1}{2}$ -in. radius. Considering that some of these crankshafts weigh over 100 lb., this amount of metal removal is much beyond the sensitivity of the average industrial scale. In most crankshaft balancing machines the crankshaft is rotated in bearings which are mounted flexibly so as to measure the amplitude of vibration. Due to the method of counter-weighting, there are many unbalanced couples in the crankshaft, but they are usually designed to cancel one another over the length of the crankshaft, as far as end bearings are concerned. As the speed increases, the effect of these internal couples will tend to deflect the crankshaft so that it will assume a different shape than when it is installed in an engine where it is guided with intermediate bearings. For this reason it is desirable that a low-speed balancing operation be used.

Tooling of the Packard 120 Cylinder Block

R. N. Brown, master mechanic of the Packard Motor Car Co., gave a talk, illustrated by moving pictures and lantern slides, on the entire sequence of operations on the 120 cylinder block. He acknowledged the technical assistance in the development of the line given by the Ingersoll Milling Machine Co., Rockford, which furnished the

entire equipment on contract with a guarantee that the machines would produce within the limits specified and at a definite rate of production. The complete line, including some of the older machines furnished by Packard and rebuilt, was set up in the Ingersoll plant and tested on approximately 400 blocks before the unit was shipped to Detroit. Thirty-three new machines were furnished and 1037 special jigs, fixtures, gages, cutting tools and holders were supplied.

The equipment featured the Ingersoll power pack, which is electrically controlled and is entirely automatic in operation. The moving pictures showed how the block was loaded in each machine and how the power pack units advanced into the work and withdrew by a single push-button control.

Carbide Cutting Tools

Ten outstanding advantages were credited to hard carbide cutting tools by J. P. Wells, tool supervisor, Pontiac Motor Co., as follows: Faster cutting, longer tool life, reduction of cut, smoother finish, greater accuracy, minimum distortion due to lighter feeds and higher speeds, combined cuts, absence of breaking away of edges on the work, reduction in heat, and the possibility of machining harder materials. Mr. Wells showed a number of lantern slides illustrating typical carbide tool applications. One was a carbide-tipped core drill operated at 73.5 ft. per min. which had a total life of 100,000 cylinder blocks and an output of 5000 blocks per grind. Piston-grooving tools require a high degree of accuracy and the long tool life obtained is an unusually advantageous factor. In fact, Lo-Ex piston material, which is a silicon-aluminum alloy, is extremely hard and abrasive and cannot be machined closely except with carbide tools.

Among the materials that are being cut with carbide tools today are cast iron, brass, bronze, nickel, phosphor bronze, aluminum, babbitt, Castaloy, malleable and die cast metals, also molded fibers for brake linings, laminated phenolic materials, window glass, porcelain, hard rubber and mica. There are also a few steel applications, but further work remains to be done before cemented carbide can be used as successfully on steel as it is today on cast iron. The problem is a most complex one and involves not merely the proper grade of carbide, but also proper tool design and, of special importance, the machine.

When starting a carbide tool on a new job, it is well to begin with 1/3 reduction of feed and increase

until the most economical feed is reached. Speed can be increased with carbide tools and in most cases 100 per cent increase is satisfactory practice over high-speed steel tools. Vibration is particularly detrimental to efficient performance, which is true of any cutting tool, but more so with carbide metals, due to the extreme hardness and consequent lower strength. This does not mean, however, that carbide tools can be used only on the latest type equipment, since 95 per cent of all such cutters are now being used on machines five or more years old.

Frank W. Curtis, Firthite Division manager, Firth-Sterling Steel Co., in discussing Mr. Wells' paper, reminded the audience that the higher cutting speeds available with carbide tools mean that more power must be supplied and hence a larger tool employed to absorb the heat. The heavier the shank, the better. In designing tools it should be remembered that carbide material is hard and brittle and will crush or break if too thin. A good rule is to proportion the width as twice the thickness, and the shank four to six times the thickness of the tip. If the shank deflects materially, cracked tips will follow. Overhanging should not exceed 75 per cent of the height of the shank. Mr. Curtis also pointed out that the new diamond-faced wheels are so much faster in grinding cemented carbide tools that they more than pay for the added expense involved.

Manufacture of Elliptical Skirted Pistons

E. S. Chapman, general works manager, Plymouth Motor Corp., described Chrysler practice in making aluminum alloy pistons. The material is received in ingots which are melted in small open-hearth, oil-fired furnaces out of which the molten metal is dipped by hand ladles. Permanent molds and permanent collapsing cores are employed, with gravity pressure only. The casting is poured with the head up and a sprue of generous size is provided to take care of shrinkage. Heat-treatment follows in an overhead oven which normally provides six hours of soaking at 400 deg. F. After heat-treatment the castings go to a punch press which crops the sprues.

In order to produce a close fit under cold and hot operating conditions, the skirt of the piston is made in the form of an ellipse

whose minor axis is 0.011 in. less than its major axis. The skirt is also tapered slightly. The piston is machined in 14 operations, the first of which is to bore, face and chamfer the open end. Drilling, reaming and chamfering of the piston pin hole follow. In the third operation, pistons are loaded in a 6-spindle automatic chucking machine in which the O.D. is rough and finish turned, the ring grooves turned and the head end faced. All tools in this operation are tipped with tungsten carbide. A series of multiple drilling operations follows, with the work held in a pot-type fixture while the unit drilling heads are arranged around it on a horizontal table. The horizontal and vertical slots in the piston are sawed in a special milling machine with fixtures mounted on a rotary table.

Rough and finish cam grinding of the outside diameter is performed on centerless grinders in which the regular wheel has been replaced with a nitrided 6-lobe cam. The machines are arranged with an automatic infeed attachment which assures that the piston is ground elliptically in the proper relation to the piston pin hole.

The piston pin holes are rough and finish bored with single-point boring tools tipped with tungsten carbide. Limits are held to 2 "tenths." An interesting operation is the one used to bring the pistons to a common weight. The machine consists of a cam feed drilling unit used in conjunction with a scale. The piston, pin and sleeve are placed in the scale platen which is lowered onto the cutter according to the weight of the assembly. Limits are plus or minus two grams. After all machining operations are performed, the pistons are given an anodic treatment to produce a hard oxide film on the surface.

Laminated Safety Glass

J. L. McCloud, of the Ford Motor Co., read a paper prepared by R. H. McCarroll. He traced the early development of laminated safety glass from the days of Benedictus, who named his product "Triplex" back in 1910. Ford obtained the manufacturing rights on the Triplex process in 1927, and at first cellulose nitrate was employed for the transparent middle layer of the so-called sandwich. Owing largely to the actinic effect of sunlight, deterioration of the material produced rainbows and discolorations. Other difficulties as well led to the development of better bonding substances and the practice of sealing the edges of the glass sandwich to prevent the entrance of air or moisture.

Concrete Reinforcing Steel
Institute Meeting Page 68



THIS WEEK ON THE ASSEMBLY LINE



... Automobile production believed to have approached peak rate; summer decline to be gradual.

o o o

... Steel market active with prices well maintained.

o o o

... Ford enters equipment market with rumors about small V-8 again heard.

o o o

... Automobile makers study sentiment for shorter work week.

DETROIT, April 28.—Although factories are gearing production a little closer to sales in order to be prepared for changes during the coming months, May schedules on the average will be close to those of April and in some instances will be even higher. It is understood, for example, that tentative Plymouth schedules may run as high as 15,000 units a week during May as against approximately 12,000 at the present time.

Cram's estimate of automobile production for the week ended April 25 again showed an increase over the previous week, up from 119,834 to 120,519 units for United States and Canada. This is the ninth consecutive week in which schedules have been stepped up, but the curve seems to be flattening out somewhat to indicate that the peak will soon be reached. Even should a decline in production take place, from the way retail sales

are going at present it looks as if output would be sustained well above the 100,000 per-week-mark for some time to come. Last year production dipped sharply from the April high. The curve will slope downward much more gently this summer.

Alfred P. Sloan, Jr., predicted in a speech at Saginaw last week that General Motors would produce approximately 2,000,000 cars in 1936. At the annual meeting of the Chrysler Corp., K. T. Keller, president, reported current retail sales of Plymouth, Dodge, DeSoto and Chrysler passenger cars and Dodge trucks running substantially in excess of sales at the same time last year. Orders on hand indicate a sustained volume of production throughout the spring at a higher level than in the corresponding period of 1935. Retail sales during the past week established a new record.

With sales booming, Chrysler reported the largest first quarter earnings for any similar period in the company's history. On the basis of a net profit of \$11,453,439 or \$2.65 a share on the capital stock, the directors declared a dividend of \$1.50 a share. In the previous quarter \$1 a share was paid. The corporation is in an extremely sound financial condition and showed an increase of almost \$11,000,000 in cash and marketable securities during this quarter and an increase in current assets of over \$14,000,000 since the first of the year.

Steel Market Active

Because of the continued activity in automotive production, steel sellers have been enjoying a very lively market. Now that prices have been stabilized, the chief factor in sales is getting to be service, principally in the form of prompt deliveries. Automobile manufacturers' frequent changes in schedules have often resulted in a mill getting an order largely because it could deliver the specification to meet a revised delivery date. There are still some stray shipments of steel being made under the first quarter price conditions, but these are largely to clean up deliveries postponed because of flood conditions.

Since the main problem in the last few weeks has been to obtain specifications of steel to meet rising production demands, little consideration has been given by the buyers to the new quantity differential set-up. Certainly no attempts have been made thus far to try to chisel down the rather strict requirements as to a single gage

By FRANK J. OLIVER
Detroit Editor, The Iron Age



and grade of stock in a single order, other than to place a more liberal interpretation on the shipping time. This last factor has largely been at the discretion of the mills who may find it inconvenient to ship 150 tons of a classification the day it is made, if it is made in a day. The spirit of the new price set-up will still be maintained by extending the shipping period over several days and even one calendar week.

From the present feeling among steel makers and their local representatives, it is quite apparent that an extremely strong front will be presented to buyers on this whole question during the coming months. Whereas a year ago competing sellers may have been charging one another with having started price concessions, today they are pointing with pride to the strong front that the industry as a whole has presented to the automotive buyers. It is the smaller buyers who have felt the chief effect of new quantity differentials and it is from these sources that the only kicks are coming.

Ford Enters Equipment Market

After about four months of inactivity in machinery buying, the Ford Motor Co. has once more entered the market in a rather big way. From what can be gathered, there is apparently a hurry-up program under way to get together machinery for a small size V-8 engine line. About 50,000 to 60,000 of these motors are to be built for shipment abroad to bolster up production in Ford plants in England and France. In the past two years there have been rumors cropping up from time to time that Ford would bring out a low-priced

eight. More than once the car has actually been reported in production. Most of the machinery for the English job was bought in this country, however, and run on an experimental basis before it was shipped abroad. During that time a number of complete engines were made at the Rouge plant. Whether a similar situation is coming up at this time or whether the intention is ultimately for the Ford Motor Company to get into production on a small size V-8 is still very problematical. Ford is also engaged in lining up machinery for a new rear axle at the present time for the 1937 model.

It seems pretty well agreed among the guessers in Detroit that Ford will adopt a body similar in contour to the present Lincoln Zephyr for next year's car and there seems but little doubt that an all-steel top will be incorporated. Reports are current also that Dodge will follow along the

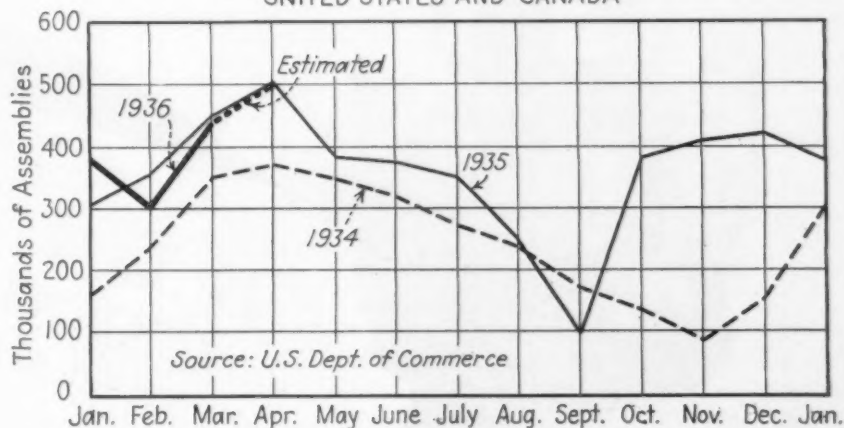
lines of the Lincoln Zephyr, which after all is closely patterned after the Chrysler Airflow, particularly from the windshield back. The resemblance ceases when front ends are compared. It was Chrysler, however, who pioneered the construction of having frame load carrying members carried into the body and over the heads of the passengers.

It now turns out that the machinery being bought for the Chrysler Jefferson Avenue plant will be primarily used for machining the Dodge six-cylinder truck engine now made partly at Plymouth and partly at the Dodge main plant. The new line will also be flexible enough to handle production of De Soto and Chrysler six-cylinder engines. Net output is said to be about 60 blocks per hr.

The automobile industry is not overlooking the political significance of the current situation.

(CONTINUED ON PAGE 54)

TOTAL AUTOMOBILE PRODUCTION, CARS AND TRUCKS
 UNITED STATES AND CANADA





**Not JUST JOBS
but Every Job
A PROFIT**

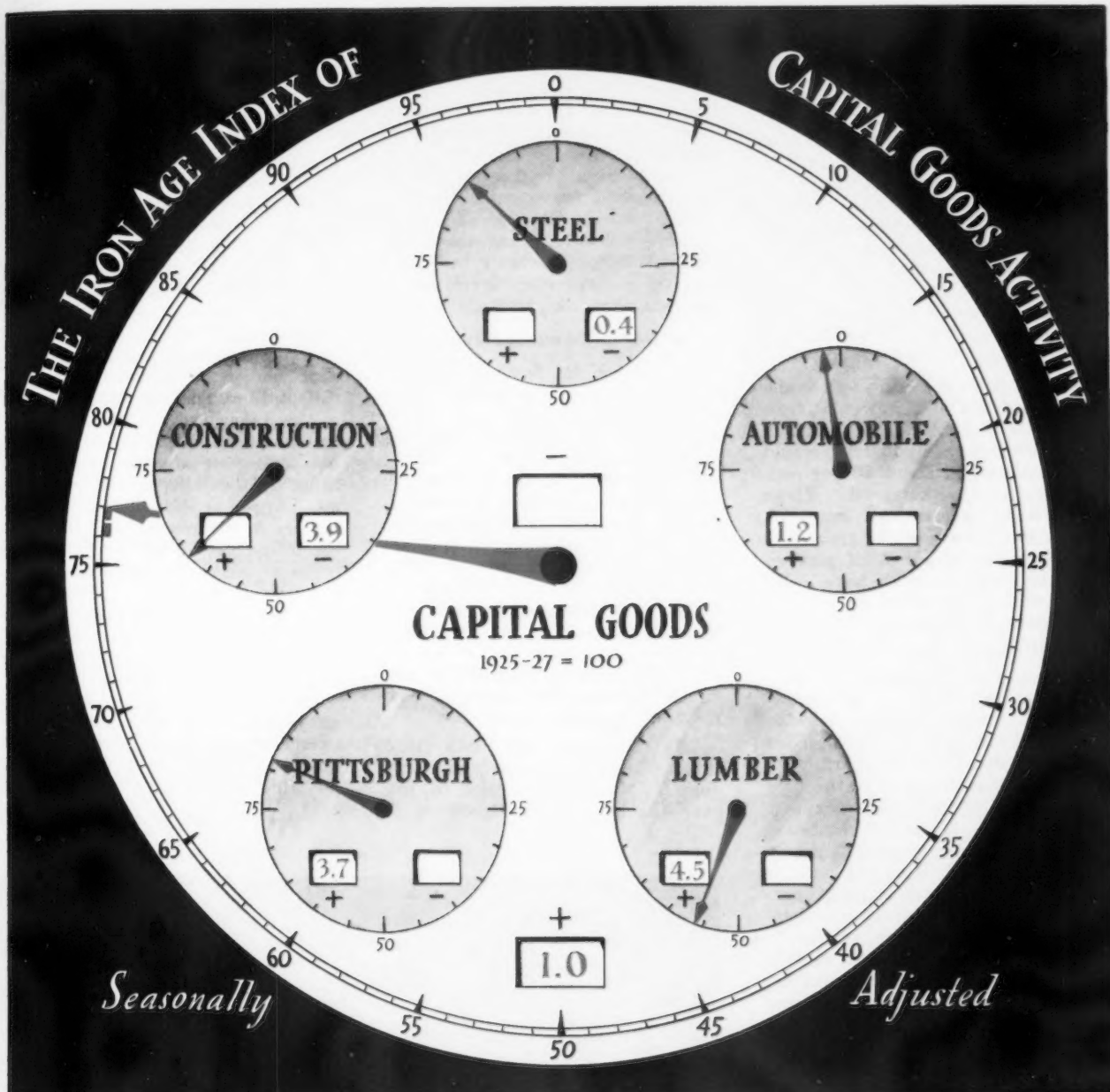
FACTS are FACTS, and sometimes they hurt. Too often work in production has been considered as "Just Jobs". They've been coming off-the-line with O. K. inspection. They've been coming off-the-line in satisfactory volume. And too—in the final analysis the unit price has apparently been approved.

However, has it ever occurred that an Engineering Survey from an outside viewpoint might bring out Cost-saving Facts of which those closer to the production problems had not been aware?

Bullard Engineering Surveys and Estimates are based on the thought "Not Just Jobs but Every Job a Profit". Our Representatives will gladly assist in "ferretting-out" what may be now "Just Jobs", but which through the adoption of Mult-Au-Matics can become "Every Job a Profit".

Let our Representatives recommend
Type "D" Mult-Au-Matics
Type "J" Mult-Au-Matics
in sizes to meet the requirements of your work

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Same Week Last Month	Preceding Week	Last Week
68.5	76.0	77.0
74.9	87.8	87.4
87.3	96.3	97.5
55.0	51.5	56.0
45.1	77.4	81.1
79.3	66.9	63.0

COMBINED INDEX		
Steel Ingot Production	57.0	63.0
Automobile Production	57.5	69.5
Lumber Shipments	89.9	78.9
Pittsburgh Industrial Production	47.3	62.9
Heavy Engineering Construction	52.5	66.7
	37.8	37.6

Same Week 1935	Same Week 1934	Same Week 1933
57.0	63.0	35.5
57.5	69.5	35.4
89.9	78.9	38.8
47.3	62.9	36.2
52.5	66.7	41.2
37.8	37.6	25.4

THE level of activity in several important heavy goods industries has been boosted 1.3 per cent, according to THE IRON AGE weekly index of capital goods activity. Last week the index rose 1 point to 77.0 per cent of the 1925 to 1927 "normal" rate. While steel mill operations showed little change, there was a further increase in automobile production, and a continued upward trend in industrial production at Pittsburgh. A particularly wholesome feature was the rise in volume of lumber shipments. On the other hand,

heavy construction work in progress dropped off additionally last week, as recent awards, reported by the *Engineering News-Record*, have not been up to the high levels of the earlier part of the year. Last week's figure marked the lowest point touched in 1936 to date.

The latest index number is 35 per cent above the comparable figure for 1935, and 22 per cent above the comparable 1934 level.

Components of The Index: (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

(CONTINUED FROM PAGE 51)

cance of the overwhelming vote for a shortened work week brought out in a recent informal poll by the American Institute of Public Opinion. With three-quarters of the people in favor of a shortened work week, it is not likely that such a policy will be overlooked by either the Democrats or Republicans in drafting their platforms. Detroit does not want a shorter work week. What Detroit wants is a longer work year. Some real steps in this direction have been taken during the last 12 months, the most significant one being the introduction of models in November.

If a 30-hr. week were to become the law of the land, it would mean that since about the first of March the automotive industry would have had to add about 50 per cent more workers to its payrolls. These men, being green and inexperienced, would have added greatly to the confusion and cost of production and they would have been faced with a lay-off by early summer when the seasonal decline in production sets in.

Detroit manufacturers believe that workers deserve the opportunity of working 50 hr. a week or more in boom days to make up for the lean weeks that come during the middle of summer, and in the past winter, during ice-bound February. Furthermore, it has been found that there is a minimum yearly pay below which it is not safe to go without having a large proportion of the working force completely dissatisfied. The suggestion is made that when the work week is shortened pay should be increased. Detroit has already set the pace for the country as far as wage rates are concerned. It will be a long time before any other industries, even in the metal-working field, catch up with present hourly rates in the automotive industry.

The improvement in yearly earnings of automobile workers has been brought out in some recent surveys. Annual earnings in 1934, for example, according to recent statistics of the Department of Labor, were \$941, compared with an average of \$1,250 for annual earnings of individual automotive workers in 1935, as reported by the Automobile Manufacturers Association. The average earnings of Ford shop employees during 1935 was \$1,372 and for the group that worked the full year it was \$1,600. In revealing these figures a few weeks ago, W. J. Cameron of the Ford Motor Co. indicated that for the present year, with the \$6 a day minimum, a man cannot earn less than \$1,500.

Ford Motor Co. differs from

most automobile companies in that only one-tenth of 1 per cent of its workers are on a salary basis. The rest are on an hourly rate and while the minimum is high, the average is not above other plants. Chrysler and General Motors, while they have lower minimum standards, show averages that are extremely high for these times. It is understood, for example, that the average hourly rate for Chrysler employees last year was about 82c. General Motors recently indicated that its present wage levels are 5 per cent above the 1929 standard.

Labor Faces Internal Troubles

This week in South Bend the United Automobile Workers Union will meet to choose its own officers and outline its program, after being under the supervision of the A. F. of L. for an eight-month probationary period. Francis J. Dillon, who has been heading the U.A.W. by appointment of William Green, hasn't a chance of being elected president of the group when it cuts loose on its own. For the past few months the local office in Detroit has been more or less in a state of siege between Dillon and Homer Martin, vice-president, and Ed Hall, secretary-treasurer.

The real battle in South Bend this week will be to see what steps John L. Lewis will take to win over the newly elected officers to

his side. Dillon is a loyal Green man and, whereas the Martin-Hall group claim no connection with Lewis' committee, in general they are in agreement on an industrial union set-up.

New Oil Conditioner

An entirely new oil filtering and conditioning system which employs a secret impregnated fibrous compound, known as Percolite, has been announced by the Handy Governor Corp. of Detroit. When oil is passed through this material any acid present is neutralized, abrasives and other foreign material are removed, sludge is eliminated, water is trapped and even colloidal carbon, which discolors oil, is taken out. The nature of the purifying element is such as not to impose any material resistance to the flow of the incoming oil. Large particles of foreign matter are first screened out and after the oil passes up through the Percolite an alkaline neutralizer takes out any acid content. The manufacturers claim that the device will return to the crankcase pure, clean oil, having its original color and all its original lubricating properties, thus postponing indefinitely crankcase oil changes. The cartridge needs to be changed about every 10,000 miles. It can be adapted to either new or old cars.



THIS new oil conditioner, shown installed on a Ford V-8 engine, is said to maintain oil in its original state of clearness and efficiency through the use of a new type of purifying element. The need for oil changes is said to be postponed indefinitely.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly
as More Recent Figures Are Made Available.

	March, 1936	February, 1936	March, 1935	Three Months 1935	Three Months 1936
Raw Materials:					
Lake ore consumption (gross tons) ^a	2,897,867	2,632,306	2,582,986	7,330,648	8,481,741
Coke production (net tons) ^b.....	.....	3,293,542	3,012,692	8,775,676	.....
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	2,040,311	1,823,706	1,770,028	4,855,916	5,889,902
Pig iron output—daily (gross tons) ^c	65,816	62,886	57,098	53,955	64,724
Castings:					
Malleable castings—production (net tons) ^d.....	.....	40,449	42,808	127,585	.....
Malleable castings—orders (net tons) ^d.....	.....	38,110	40,237	126,030	.....
Steel castings—production (net tons) ^d.....	.....	47,954	31,940	90,662	.....
Steel castings—orders (net tons) ^d.....	.....	51,701	30,723	94,970	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	3,346,489	2,967,803	2,868,141	8,517,437	9,363,731
Steel ingot production—daily (gross tons) ^e	128,711	118,712	110,313	110,616	120,048
Steel ingot production—per cent of capacity ^e	58.65	54.09	49.83	49.97	54.70
Finished Steel:					
Trackwork shipments (net tons) ^e	6,258	4,116	3,440	8,665	13,740
Steel rail orders (gross tons) ^e	62,300	147,450	79,418	210,592	424,291
Sheet steel sales (net tons) ^f	251,818	138,244	193,057	698,210	564,867
Sheet steel production (net tons) ^f	207,820	191,359	227,082	681,858	622,179
Fabricated shape orders (net tons) ^g.....	.....	114,545	102,325	242,472	.....
Fabricated shape shipments (net tons) ^g.....	.....	69,855	85,132	243,286	.....
Fabricated plate orders (net tons) ^g.....	.....	27,830	16,832	50,674	.....
Reinforcing bar awards (net tons) ^g	24,025	23,830	17,335	57,350	115,665
U. S. Steel Corp'n. shipments (tons) ^h	783,552	676,315	668,056	1,785,248	2,181,281
Ohio River steel shipments (net tons) ⁱ	116,510	13,782	75,072	192,097	196,052
Fabricated Products:					
Automobile production, U. S. and Canada ^k	442,545	304,232	451,768	1,108,941	1,127,331
Construction contracts, 37 Eastern States ^l	\$199,028,300	\$142,050,200	\$123,043,500	\$297,864,500	\$545,871,300
Steel barrel shipments (number) ^d.....	.....	508,974	525,022	1,366,284	.....
Steel furniture shipments (dollars) ^d.....	.....	\$1,484,145	\$1,220,533	\$3,424,249	.....
Steel boiler orders (sq. ft.) ^d.....	.....	810,387	647,062	1,322,572	.....
Locomotive orders (number) ^m	13	46	8	9	73
Freight car orders (number) ^m	627	7,236	0	830	8,907
Machine tool index ⁿ	105.3	112.1	62.3	†60.3	†109.4
Foundry equipment index ^o	115.0	110.4	69.3	†77.2	†117.4
Foreign Trade:					
Total iron and steel imports (gross tons) ^p.....	.....	43,358	21,409	73,098	.....
Imports of pig iron (gross tons) ^p.....	.....	14,660	2,708	15,482	.....
Imports of all rolled steel (gross tons) ^p.....	.....	18,208	13,292	40,789	.....
Total iron and steel exports (gross tons) ^p.....	.....	213,736	323,035	814,312	.....
Exports of all rolled steel (gross tons) ^p.....	.....	65,947	78,483	219,208	.....
Exports of finished steel (gross tons) ^p.....	.....	62,322	68,146	193,816	.....
Exports of scrap (gross tons) ^p.....	.....	142,165	228,338	559,688	.....
British Production:					
British pig iron production (gross tons) ^r	633,600	584,700	554,200	1,558,500	1,814,200
British steel ingot production (gross tons) ^r	980,100	938,500	841,900	2,369,200	2,831,100
Non-Ferrous Metals:					
Lead production (net tons) ^s	35,150	34,127	32,921	89,730	105,573
Lead shipments (net tons) ^s	36,743	33,086	28,973	95,191	104,419
Zinc production (net tons) ^t	42,483	36,228	36,735	105,338	120,628
Zinc shipments (net tons) ^t	38,159	39,918	41,205	111,537	124,545
Deliveries of tin (gross tons) ^v	5,520	5,600	5,495	14,000	17,755

†Three months' average.

Source of figures: ^aLake Superior Iron Ore Association; ^bBureau of Mines; ^cTHE IRON AGE; ^dBureau of the Census; ^eAmerican Iron and Steel Institute; ^fNational Association of Flat-Rolled Steel Manufacturers; ^gAmerican Institute of Steel Construction; ^hUnited States Steel Corp'n.; ⁱUnited States Engineer, Pittsburgh; ^jWhen preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; ^kF. W. Dodge Corp.; ^lRailway Age; ^mNational Machine Tool Builders Association; ⁿFoundry Equipment Manufacturers Association; ^oDepartment of Commerce; ^pBritish Iron and Steel Federation; ^qAmerican Bureau of Metal Statistics; ^rAmerican Zinc Institute, Inc.; ^sNew York Commodities Exchange.



... Corporation tax bill engages attention of Congress and criticism of wide section of informed public.

□ ○ □

... Secretary Ickes and Rex the Resettler seek share of new WPA funds, but Harry Hopkins seems likely to get it all; he even wants more!

□ ○ □

... Representative Dirksen provides strong defense of basing point system.

□ ○ □

... National Coal Association thinks "piped coal" is not a pipe dream.

○ ○ ○

BY L. W. MOFFETT

*Resident Washington Editor,
The Iron Age*

○ ○ ○

WASHINGTON, April 28.—Vigorously attacked as a revolutionary and inadequate measure directed more toward "reform" of business than to revenue, the highly complicated 249-page House corporate tax bill is believed to face certain widespread revision at the hands of the Senate Committee on Finance which will begin hearings on the bill Thursday. . . . Not only is the bill so intricate that simplification is considered imperative, but it is also admitted it will fall far short of yielding the necessary revenue even to keep in sight of the continued

prodigious spending and extravagance of the Federal Government. . . . With revision looking to both simplification and greater revenue, it is likely that still another tax bill will be dished up at the next session of Congress. . . .

New Dealers, having the political campaign in mind, are studiously refraining from additional direct taxes on the little fellow, pending the election. . . . Futile though the principle is, the dominant note still is "soak the rich" and soak "big business." . . . Opponents of this cult maintain that in some respects the soaking will douse the little fellow more than it will the big fellow. . . . Taking from him surpluses necessary to rebuild a business weakened during the depression. . . . Both Democrats and Republicans assail the bill. . . . Its constitutionality is also challenged. . . .

The majority report of the House Committee on Ways and Means itself is authority for the disturbing

fact that the bill will not meet President Roosevelt's demand for \$517,000,000 in so-called temporary taxes for the next three years. . . . The report says it will produce only about \$173,000,000 in addition to other items provided for in the measure, the corporate tax proposals being estimated to yield an "average" of \$620,000,000 for the next nine years. . . .

The estimated shortage in revenues is placed at about \$300,000,000 over the next three-year period. . . . The majority report proceeds frankly to admit the probability of more taxation at the "next session of Congress, which can then act more intelligently in the light of conditions then existing." . . . Those who have assailed the bill, noting this naive confession, have commented that less intelligent consideration of taxation would be difficult. . . . Chairman Harrison of the Senate Finance Committee has scoffed, perhaps with tongue in cheek, at the idea of more taxation at the next session but clearly it is inevitable unless his committee provides a product that will yield much more than the House bill will. . . . But whether it does or does not do this, it is certain that a more cumbersome, complex measure than that turned out by the House could hardly be developed. . . . The latter is a lawyer's feast, though one it is not likely he could assimilate sufficiently to make it clear to a court. . . . Its enforcement, many say, would not be possible. . . . As for business men who would attempt to understand the measure, it would be a bad headache even to students of taxation. . . .

For business and industry the principal sections of this omnibus tax bill are the first and second of its four parts. . . . The first title proposes to repeal all existing corporation taxes after Dec. 31, 1935, and to substitute a plan of taxation based upon the net income of the corporation, measured by the amount of adjusted net income of



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the corporation withheld from distribution through dividends. . . . In short, it is intended to compel distribution of corporation surpluses to stockholders. . . .

Title II repeals corporation taxes, including corporation income taxes now existing and capital stock and excess profits taxes now upon corporations. . . . The bill leaves individual income taxes as they are in the present law except that, instead of exempting dividends from corporations in the hands of individual taxpayers from the normal tax, the bill imposes the normal tax of 4 per cent on dividends from corporations as well as upon income from other sources. . . . Corporations are divided into two classes, those having a net income of \$10,000 or less in one class and corporations having a net income of more than \$10,000 in the second class with intricately graduated schedules and involved verbiage, to govern assessments and allow for retention of portions of the net income. . . .

Representative Hill says that by repeal of the capital stock and excess profits tax, there is a loss of \$168,000,000 and by repeal of the corporate income tax the loss is \$964,000,000, making a total loss of \$1,132,000,000. . . . But on the basis of a 30 per cent retention of net income of corporations as an undistributed part of income, corporations would pay under

the House bill \$1,065,000,000. . . . The net loss from corporation taxes, therefore, would be \$67,000,000, according to the estimates of income from the new taxes, which opponents say cannot possibly be accurately made. . . . It is estimated that the yield from individual income taxes will rise \$658,000,000, from \$1,153,000,000 to \$1,811,000,000, so that the net gain in revenue would be \$591,000,000. . . .

Great hopes are being placed by New Dealers in further industrial recovery, which they seize upon to ballyhoo upon every possible occasion and to which, humorously enough, they give credit to the New Deal. . . . Much of this obviously is intended to overcome the blistering and widespread assaults on the New Deal coming from business and industry. . . . They contend that recovery has set in despite the New Deal and because of Supreme Court decisions knocking out New Deal legislation. . . . And many insist it will not be sustained unless government costs are sharply cut soon. . . .

Representative Crawford of Michigan, has called the House tax bill the most revolutionary step which this country has taken from the standpoint of an economic program or economic procedure since the creation of the corporate entity. . . . He claims it reflects the philosophy of Prof. Rex G. Tugwell, New Deal Brain Truster No. 1. . . .

Mr. Crawford said that if the bill should go into force, corporation managements of the country would have to depend upon learned men whose prayers the bill answers, that is, technicians in law, in tax procedure, in accounting and in finance, to assist in managing the affairs of corporations, whether large or small. . . . He exhibited a chart with which he attempted to illustrate the effect the bill would have on operations of modern corporations, the stocks and bonds of which are held by people who desire to be in a liquid position. . . .

"We will take the United States Steel Corp., and we find that at Dec. 31, 1934, it had a surplus of \$528,000,000," said Representative Crawford. "At Dec. 31, 1935, it had a surplus of only \$252,000,000. Its operations for 1934 resulted in a deficit of \$21,667,000. Its income in 1935 was \$1,146,000. I find that it paid dividends to the full amount in 1934 and to the full amount in 1935."

Here, within one year, it was stated, a corporation's surplus shifted from \$528,000,000 to \$252,000,000. The shift was attributed to a cleaning up of corporation adversities "which took place between the beginning of the economic wash-out of 1929 and what happened at the time they started out of the deficit period." Mr. Crawford said it would be very interesting to extend the figures for a number of years and explore into what might have happened to the United States Steel Corp.'s operations for the period 1929 to 1935, both inclusive.

"Taking this tax proposal and applying its provisions to the operating results of corporations like United States Steel, the American Sugar Refining Co., the Great Western Sugar Co., General Foods, General Mills, American Telephone & Telegraph, would all lead us into most interesting discussions with regard to this staggering program which we are about to adopt."

After dealing with these larger corporations, Mr. Crawford spoke of application of the bill to the operating results of 43,000 other corporations which return net income in excess of \$10,000 annually. He said he was sure that in scores of cases the direct result of the administration of the bill in its present form would be the financial death of such corporations and "thus move us more swiftly and completely toward a greater monopolistic control of American industry and commerce."

"With the varying industrial, financial, geographical, seasonal, and credit conditions which exist throughout this land, how anyone familiar with the operating problems of the modern corporation can

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come to the conclusion that a 'straight-jacket' in the form of this tax is good for the 'general welfare' is more than I can understand," said Mr. Crawford. "It is my firm opinion that this tax measure cannot be adapted to these corporate problems without creating havoc in fabrication, transportation, marketing, and financing."

In attempting to reply to attacks on the tax bill, its supporters harp on the usual cry for "constructive criticism." . . . One outstanding criticism, obvious to the taxpayer with no political axe to grind, is that a halt be called on mad spending, that worse than worthless alphabetical soup agencies be abolished, and that relief by use of Federal funds be taken out of politics and administered through non-partisan agencies rather than by a centralized bureaucracy in Washington. . . . Legitimate private business might also be left alone and given a chance to further absorb unemployment. . . . It was shown that such a policy would easily save more than \$1,000,000,000 a year, and open the way for a balanced budget, now daily becoming more unbalanced under the policy of the continued spending spree representing an outgo of almost \$2 for the income of every \$1. . . . Such a suggestion is scorned. . . . And even as it was being made, Harry L. Hopkins announced that the ante for the new WPA spending orgy had been raised \$600,000,000 above the previous estimate of \$1,500,000,000 so that Congress now is asked to appropriate \$1,560,000,000 for so-called relief. . . . The more it is proposed to raise by taxes, the greater the demands for still more appropriations which if continued much longer will inevitably lead to national bankruptcy and to the collapse of tax-burdened industries. . . .

Mr. Hopkins wants all the money for himself, too, but two other New Deal rugged individualists, Harold L. Ickes, Public Works Administrator, and Dr. Tugwell, pooh-bah of the Resettlement Administration, are hoping for large slices of the funds. . . . Mr. Ickes, however, has denied he has lobbied for \$700,000,000, as has been charged, and, of course, Dr. Tugwell has not admitted using his influence to garner \$200,000,000 as has been claimed. . . . In any event Mr. Hopkins promises to be the winner unless something should develop to deprive him of White House backing. . . . The Hopkins breakdown of proposed expenditures looks to be innocent of boondoggling but it is strongly suspected this would find a conspicuous part in the program once Congress, as usual, meekly yields to Administration demands. . . . The pro-

posed expenditures, as given by Mr. Hopkins to the House Committee on Appropriations, are broken down as follows: Highways, bridges and culverts, \$525,000,000, of which \$250,000,000 is listed for farm-to-market highways; public buildings, \$175,000,000; sewers and waterworks, \$175,000,000; trees and parks, \$175,000,000; sanitation and drainage, \$45,000,000; airports, airways and publicly-owned transit companies, \$45,000,000; miscellaneous construction, \$60,000,000; water conservation, \$105,000,000; educational, \$90,000,000; woman's program, \$90,000,000 and National Youth Administration, \$75,000,000. . . . Even if the other expenditures are actually applied as indicated, it is suspected that there are tremendous boondoggling potentialities in the last three items. . . .


Meanwhile the Governing and Advisory Boards of the Associated Contractors of America at its two-day spring meeting, ended today, said this group would urgently press Congress for the earmarking of at least \$700,000,000 for PWA. . . . It was predicted that unless additional Federal funds are made for continuation of PWA after July 1, there would be a catastrophic collapse of the construction contract market.

Introduces Strong Defense of Basing Point System

Thirteen objections to abolishing the basing point system were pre-

sented to the House of Representatives by Representative Dirksen, Republican, of Illinois, in a recent statement urging elimination of the anti-basing point provision from the Patman-Robinson price discrimination bill. The insertion of the provision in that measure was the object of much protest. It was protested by both those who, like Mr. Dirksen, are against the principle of the provision itself and those who considered that it is incidental to the purposes of the Patman-Robinson bill and contend that the subject should be dealt with separately as provided by the Wheeler-Utterback anti-basing point bill.

In strongly supporting the basing point method of quoting prices, Mr. Dirksen, whose home is Peoria, Ill., pointed out that it has been long-established, that it offers a means of national distribution of merchandise on equal terms and that its abolition would shift production to large consuming areas, disturb employment in existing producing centers and destroy capital investment. Small industries in the sparsely settled areas that now compete in the national markets would be compelled to curtail production greatly or be destroyed altogether. Buyers who can now buy on an equitable basis from any producer in the United States, Mr. Dirksen said, would be compelled to depend on the mill or factory closest to the location of the buyer, thus making him virtually dependent on whatever price the closest mill might quote. To abolish the basing point method of



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quoting prices, he stated, would compel producers completely to revamp and alter their sales and distribution efforts. Also, said Mr. Dirksen, the effort to abolish the system "only adds to the confusion that now besets industrial producers to the point where they do not know what to do, or what they are expected to do. On the one hand, we have the Guffey bituminous coal-control bill, the proposed textile-control bill, and a newly-threatened NRA, all of which lead toward a cartelization of industry, while, on the other hand, there is an apparent tendency to destroy bigness. It is a confusing and inconsistent approach to an industrial problem which does not make sense." Answering the argument that "phantom freight" charges are concealed in f.o.b. basing point prices, Mr. Dirksen said that whatever is gained in freight charges by a mill to some nearby point is quite offset by the extra charges which a mill must pay in shipping to a more distant point. Abolition of the system, it was pointed out, would localize shipments, reduce volume of production, increase overhead costs and necessarily mean higher prices. National distribution, it was said, provides stabilized production from one end of the year to the other, despite seasonal slumps in business or despite geographical slumps. To deprive mills of national distribution, it was declared, would disturb the production level to a point which would reduce employment in some portions of the year and speed it up at other times.

"If the basing point system is abolished so that national distribution becomes impossible," said Mr. Dirksen, "there will be little or no incentive for mills and factories to engage in extensive and costly research in order to develop specialized products. Nor would there be any incentive for a national advertising campaign to place such a product on the market, because of the impossibility of competing with mills in other areas who have the freight rate advantage that comes through geographical location.

"The basing point system now used has resulted in simplification of price quotations. For 3c. one can mail a letter which can be carried from Washington to Baltimore or from Washington to Los Angeles. Yet the distance from Washington to Los Angeles is 50 times greater than from Washington to Baltimore. The efficiency of our postal system is in its simplified application. The same is true of the basing point system."

Answering arguments against the basing point system, Mr. Dirk-

sen said it is not a means of fixing but rather is a means of quoting prices, that gains and losses from freight charges offset each other and that the fundamental objection to the charge of alleged huge waste in cross hauling is the attempt to tell a buyer in what market he must purchase, despite his wishes. Such a course, said Mr. Dirksen, "would be regimentation with a vengeance."

Sees Possibility of "Piped Coal"

The most vigorous protest against extension of railroad freight rate surcharges came from the bituminous coal industry, which, through John D. Battle, executive secretary, National Coal Association, pictured to the Interstate Commerce Commission the possibility of "piped coal."

Without disclosing the actual progress that engineering direction has made or its source, Mr. Battle expanded the idea sufficiently after the hearing to indicate that experiments made have encouraged the belief that this revolutionary development in coal transportation is feasible. The coal would be propelled by water pressure through an 8- to 10-in. pipe line, Mr. Battle said, after being "ground as fine as talcum powder, and upon being dried at destination would be used in powdered form in specially designed furnaces.

Mr. Battle stated that engineers who are studying the plan have tried it experimentally and that coal has been transported by pipe line for short distances and may be eventually so carried for distances up to 200 miles. Booster stations, it was stated, would be established at intermediate points to carry the coal over long distances and over mountainous country.

Bureau of Standards Circular Deals With Iron Alloys

Valuable general information on iron alloys, with particular reference to the heat treatment of steel, is contained in Circular C-409 just released by the Bureau of Standards, Department of Commerce.

In addition to the text, which is supplemented by a bibliography, there are numerous line drawings and half-tones showing apparatus used in the production of iron, equilibrium diagrams, and many photo-micrographs showing the structures of different kinds of steels.

Judging by the many requests

which the bureau has received, this circular is expected to fill a real need for a reasonably brief and simplified statement covering the production and properties of iron alloys in general, and especially the heat treatment of steel.

Particular attention has been paid to recently developed theories of the hardening of steel and the part played by special alloying elements.

Copies of the circular are obtainable from the Superintendent of Documents, Government Printing Office, Washington, at 10c. a copy.

Exchange Surtax Handicaps Our Argentine Trade

Handicapped by an exchange surcharge of 20 per cent, sales of American iron and steel products continue to find a considerable barrier in the Argentine market, according to a report received by the Department of Commerce from Buenos Aires. European materials generally can be purchased at the official rate of exchange and thus, unlike manufactures of the United States, do not have to be financed largely by operations in the open market but are marketed under previous exchange permits.

At the present time, the report states, European manufacturers are selling in the Argentine market bars, plates, sheets, shapes, beams, rails and fish plates with little fear of American competition. Under most of these classifications, according to the report, it is doubtful whether the United States could, even under equal conditions, obtain an appreciable portion of the business. However, it is believed that if the surtax were eliminated and the difference between the official and open market rates of exchange maintained, American producers could at least get a share of the orders for rails and fish plates.

Importations from the United States currently consist of high-grade sheets which are used in the local manufacture of automobile buses, refrigerator cabinets, metal furniture, wire of all kinds, wire rope, tin plate and an occasional lot of pipe.

With the possible exception of tin plate, the report says, it is believed that practically all of this material is entering the Argentine market financed through the free or open market and paying the additional surtax. Material of this kind is also being secured from Europe and the report declares that it is within these particular classifications that competition is especially keen.

Chamber of Commerce Undertakes Survey of Unemployment in Industry

WASHINGTON, April 28.—Centering their attention chiefly on the unemployment situation, directors of the Chamber of Commerce of the United States at the opening of the chamber's twenty-fourth annual meeting, yesterday, authorized the appointment of a special committee to survey the possibilities of reemployment.

The meeting is being attended by about 2000 delegates. The unemployment question was introduced at the board meeting by John W. O'Leary, president of the Machinery and Allied Products Institute, with a view to determining what measures can be taken to absorb employables now without jobs.

"We realize that there is not just one unemployment problem, and that solution is not one prescription, but many, to meet widely different conditions," said Mr. O'Leary. "Action must be positive, not negative, that is, it must provide for creation of new wealth and new jobs to furnish the unemployed with income.

"One of the most important requisites of an intelligent approach to unemployment problems is knowledge of the specific places where unemployment has declined and where it can be increased. What we need is a broad national survey of reemployment possibilities. Business and industry, through chambers of commerce, trade associations and individual merchants, stores, services and professions throughout the country can determine our reemployment possibilities with a degree of accuracy which cannot be equaled in any other way. We should proceed to piece together the many threads of information, and then make available to all a concentrated exhaustive knowledge of reemployment possibilities.

"We all know that no individual, nor group, caused the present unemployment; nor is anyone desiring that it should continue. Every individual knows that his own welfare is bound up with the welfare of the entire nation. Most of our problems could be solved much easier and more intelligently if each of us recognized that the other feels the same way about it. It is useless to blame anyone or any group for unemployment, or to expect to force reemployment. We must understand each other and our problems and cooperate in achieving reemployment."

Mr. O'Leary presided at a special round table conference on increasing employment today when the subject was discussed in detail. The question will form the central topic of the entire meeting, though it will embrace many other subjects relating to the principles of American enterprise and re-

quirements for national progress.

Eugene C. Clarke, president of the Chambersburg Engineering Co., Chambersburg, Pa., speaking at the round table on increasing employment, discussed improvements in equipment and process. He stated that there is abundant evidence that the most highly mechanized industries are the very ones which are providing most jobs, largest payrolls and lower cost goods or services. He said that a continuation of research and improvement in equipment and

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processes is in itself essential to increased employment and a raised standard of living.

James A. Farrell, chairman of the National Foreign Trade Council, and former president of the United States Steel Corp., addressed round table on foreign trade development and approved of the Reciprocal Trade Agreement Act as a means of bi-lateral agreements based on the unconditional most-favored-nation principle. The United States foreign trade policy dedicated to this principle, it was said, offers the only possible alternative to the chaos wrought by the many arbitrary and discriminatory measures that have diverted world commerce into unnatural channels.

Answer President's Demand

There was considerable criticism of the New Deal's experimentation and its attitude toward business. The emphasis placed by the meeting on the unemployment problem was looked upon as an answer to the demand of President Roosevelt that private industry must absorb unemployed, with the implication that unless it does so, further legislation like the NRA will be asked by him.

Lewis H. Brown, president, Johns-Manville Corp., New York, addressing the General session which opened today on "Increasing Employment by Private Enterprise," said that no government ever had a greater opportunity to lead its people out of the wilderness than was presented to the Administration in Washington in the spring and early summer of 1933. Reference was made to days when NRA was getting under way.

"The Administration put itself in the position of an overseer—if not as an overlord—of business, and business permitted it," said Mr. Brown. "In the emergency, and out of consideration of the millions out of a job, business men throughout the nation gave the Government its great chance and upon Government's own terms. Whether or not it was good business, it was a great act of cooperation."

He attacked the scheme of central planning and said that today "we still have before us the spectre of 10,000,000 unemployed," remarking that the figures are only estimates. Pointing to the way of recovery, Mr. Brown reaffirmed recommendations made two years ago to the President by the Durable Goods Committee of which he was a member. Free flow of private capital into private business with the further reestablishment of con-

fidence constituted one of the recommendations.

Assurance of the profit incentive in private enterprise, taxation only for legitimate purposes and not to effect a punitive dedistribution of wealth, and clarification of the Government's policies toward measures and trends which are inconsistent with the economic system were cited as essentials to establishment of confidence.

Mr. Brown said that there is still little real confidence on the part of business men that will encourage them to go ahead courageously and aggressively in the speeding up of the business machine. The profit incentive, he said, is still under general attack.

Since the low point of 1933, private enterprise has put to work directly and indirectly 5,500,000 men and women. It has been estimated, he said, that, if relief and emergency workers employed by the Government are excluded, there are today approximately 41,000,000 people gainfully employed in this country. Of this number, it was said, slightly over 8,000,000 are engaged in the manufacturing industries. In 1929, he said, manufacturing, not including construction, employed approximately 10,000,000.

"It is perfectly obvious, then, that the manufacturing industries, which are now within 2,000,000 of their all-time employment peak, cannot be expected to reemploy as demanded by the Government all the present 10,000,000 unemployed," said Mr. Brown. "But this only brings us back to the basic fact that although business has already reemployed over 5,500,000 workers—employment of at least a large portion of the other 10,000,000 is still waiting for conditions that will restore confidence and will encourage the stimulation of the durable goods industries."

He said business leaders are just as much in favor of the avowed ideals of expressed objective of the New Deal as is the average citizen. Business men, he added, believe that to solve the unemployment problem requires a cooperation between all the leaders of American life comparable to that which prevailed during the World War. The leadership suggested, he stated, is not a substitute for political leadership, but is a part of the essential cooperation which must be brought about between Government and business. Finally, he said, business men, recognizing the extreme difficulty of solving the unemployment problem, strongly recommended that where one plan fails another be tried.

President Harper Sibley, of the chamber, in opening the general session spoke of principles of

American enterprise and took a crack at sponsors of "certain legislation" criticized by the chamber who have attacked the chamber. The chamber, said Mr. Sibley, has consistently concerned itself only with such questions of Governmental policy as bear particularly on business, dealing with the economic faults or merits of existing and proposed policies. He said the Government has certainly no justification for attacking ideals of business because there are some who have not lived up to them. The country's ills, he said, are not to be cured by the flaying of business by politicians or condemnation of politics by business.

"It is a task for both business management and political management," said Mr. Sibley. "Both must meet the issue squarely and courageously. It will not be met if business restricts its outlook to the four walls of the counting room and particular industries measure national progress in terms of their own cash balances. Neither will it be met by political fault-finding or by legislative proclamation. It can be met only by hard, cooperative work and the exercise of that most valuable attribute, still deep rooted in the American people—common sense."

Urges Improvement in Equipment

Pointing out that improvements in equipment and processes are frequently blamed for the present unemployment problem, Mr. Clarke, at the round table on increasing employment, said that there is abundant evidence that the most highly mechanized industries are the very ones which are providing most jobs, largest payrolls and low cost goods or services. Speaking on "Improvements in Equipment and Processes," he reached the conclusion that a continuation of research and of improvement in equipment and processes is in itself essential to increase employment and a raised standard of living. It is equally important, he said, that all decisions, managerial, financial, educational and governmental advance this general purpose.

Mr. Clarke said that jobs have increased at the rate of 291 per cent while population increased 218 per cent in the period of intensively improved equipment and processes since the Civil War. Eighteen new industries since 1880, it was stated, have made jobs for 1,000,000 workers directly, and many more indirectly in service, sales, transportation, etc. Displaced occupations have been replaced by new occupations which outnumber the old ones nearly three to one, Mr. Clarke stated, adding that new jobs

are less hazardous and better paying. Money reserved from profits was said to have increased the total investment in capital goods at an even greater rate.

"One need not be an exaggerated optimist to recognize the unsatisfied demands of today to picture the tremendous employment of labor required to provide for those demands," said Mr. Clarke. "Consider your own knowledge of inadequate housing, educational facilities, medical facilities, transport and other forms of things and services.

"To predict a future date when the United States will have reached a Utopian state of balanced supply and demand is inconceivable but it is possible to trace through the history of this country and to recognize our responsibility to carry on in an improved manner toward labor serving ends.

"To fulfill the obligation of continuing the progress that characterizes our civilization there are several principles from which no industry can depart, namely:

(A) The more economic use of natural materials to spread the benefits to a greater population.

(B) The conservation of labor by the improvement of labor serving equipment and better processes, toward greater earnings of capital and labor and lower prices of consumption goods.

(C) The continued research to develop the more economic use, processing, and distribution of materials.

(D) The accumulation by thrift of the necessary reserve capital to finance research and acquisition of improved equipment and facilities.

"Concurrently, with the progress of research and improvement of equipment," Mr. Clarke said, "it is essential that our educational, medical and like facilities keep apace to provide the knowledge and health essential to such growth.

"Likewise political progress is necessary. Here, as in business, it is mandatory that the basic unchanging ideas be recognized as fundamental; that laws be complementary to progress; that the transition from local to national and to international interdependence be considered in our changing political economy. Since we cannot foresee the ultimate accomplishments of a progressive people, realization must be had by all that our best contribution is the avoidance of fallacies and the continuation of improvements thus far achieved."

Mr. Clarke said that the highly

mechanized condition of highly mechanized industries is not the result of chance but rather is predetermined by investigations and research into the requirements of individuals and groups and into the best means of providing satisfactory goods or services better than formerly available and at more attractive prices. Automobiles, radios, petroleum products, foodstuffs, etc., were cited as common examples of products of such industries.

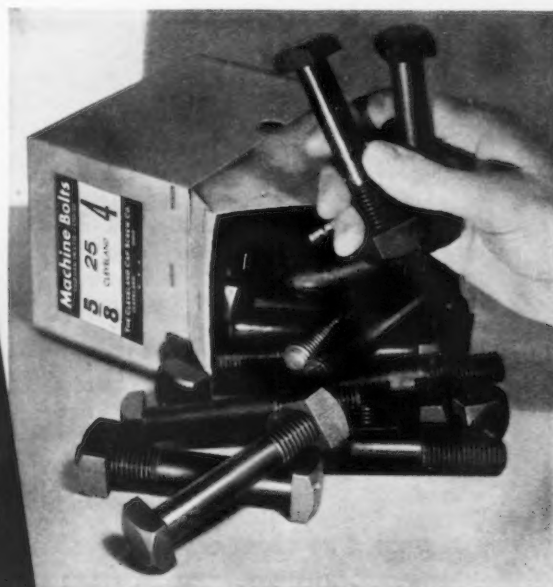
Mr. Clarke declared that while it is not well to claim too much success in the face of the current unemployment situation, it is vitally important to consider the effects of improved equipment and processes in the past and "assure ourselves that in the future, research and improved methods are as advantageous to the commonwealth as they are vital to industry."

Basic improvements in equipment and processes were said to be the studied response to the greater demands of an increasing and progressive population for less tedious labor and for more and better facilities procurable with the fruits of that labor.

Joslyn Acquires Pacific Iron & Steel

ACQUISITION by Joslyn Mfg. & Supply Co., Chicago, of controlling interest in Pacific Iron & Steel Co., engaged in structural steel fabrication at Los Angeles, has been announced by M. L. Joslyn, president. Immediate plans call for construction of a new office building on the firm's seven-acre site. The personnel of Pacific Iron & Steel Co. will remain substantially the same under the new ownership.

The total number of unemployed workers in March, 1936, was 9,649,000, according to the regular monthly estimate of the National Industrial Conference Board. This is a decrease of 201,000, or 2.0 per cent, from the preceding month, and a decrease of 390,000, or 3.9 per cent, below March, 1935. The decrease in unemployment since February among manufacturing and mechanical industries was 132,000 workers.



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Merger of Allegheny Steel and West Leechburg to Be Voted On

ANNOUNCEMENT has been made by Harry E. Sheldon, president, Allegheny Steel Co., and James Lippincott, chairman, West Leechburg Steel Co., of a proposed merger agreement between the West Leechburg company and the Allegheny company, subject to the formal approval of the stockholders of both companies. The merged corporation will be known as Allegheny Steel Co.

The merging of these two organizations would bring together two of the leading, non-competitive independent steel producers in the Pittsburgh district. West Leechburg, with an annual capacity of over 250,000 tons of strip steel, has no raw steel making facilities, but purchases semi-finished materials in billet form. Allegheny, on the other hand, has complete steel making equipment and its annual ingot capacity of 500,000 tons is sufficient to take care of the combined requirements. Allegheny Steel has never had facilities for



H. E. SHELDON

the commercial production of hot and cold-rolled strip.

The rapid development of Allegheny metal, Allegheny stainless

and the magnetic steels in strip form—has made it imperative for the Allegheny company to either build new strip rolling equipment in their own plant, or acquire such facilities by merger.

The acquisition of the West Leechburg strip mills will not only adequately meet these requirements but will also provide an experienced organization and a complete integral steel mill for the production of hot and cold-rolled strip in all qualities and grades in capacities approximately 20,000 tons per month, and finished sheets up to 72 in. wide in capacities in excess of 18,000 tons per month.

The two plants are located just 12 miles apart. The plant of the Allegheny company is located on the Allegheny River at Brackenridge, Pa., and the plant of the West Leechburg company on the Kiskiminetas River at West Leechburg, Pa.

If the merger of the two companies is approved by the stockholders, the present West Leechburg company will be represented with two members on the board of directors of the new Allegheny Steel Company.

NEWS AND MARKET INDEX

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WHEN rapid expansion forced enlargement of foundry facilities, a prominent manufacturer modernized the existing plant into a semi-continuous project, in two logical steps.

Tilting Spout Cupola. First, he fitted the cupola bottom with a tilting spout, permitting the filling of ladles at each side—first one and then the other—without interrupting the flow.

Ladles Handled on Trucks. Second, he installed Elwell-Parker Lift Trucks to take ladles carrying 3500 pounds of hot iron to molding floor—50 to 300 feet distant—and to bring empty ones back for refilling. Trucks are kept moving steadily—practically no waiting at either end.

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Benefits: Hotter, more easily-handled metal; flexibility of volume (up to 250 tons per day); and maximum speed and safety.

Elwell-Parker Engineers are ready to help you apply these same cost-reducing principles to the transporting of your own loads. Present customers will be interested in recent developments and applications.

Write, wire or telephone. The Elwell-Parker Electric Co., 4225 St. Clair Ave., Cleveland, Ohio.

New **ELWELL-PARKER** *Trucks*

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906

Armco's Founder To Be Honored

A NOVEL celebration will be held in June in Middletown, Ohio, headquarters of American Rolling Mill Co., when an entire day will be set aside as "George M. Verity Day" in honor of George M. Verity, founder and chairman of Armco. Announced on Mr. Verity's birthday anniversary, the plans were inaugurated by a group of 35 civic, business and industrial leaders of Middletown, who intend to stage a community picnic, with Mr. Verity as guest of honor.

Mr. Verity, after receiving the group's congratulations on his birthday replied, "Your visit to me cannot be complete until you have also congratulated the entire city of Middletown for making it possible for us to carry out the ambitious program we planned when we first came to Middletown."

Plan Organization Of Trucking Groups

THE establishment of motor trucking terminals throughout the United States will be made possible through the activities of the newly organized non-profit group of motor fleet owners, forwarders and brokers, the Motor

Carrier Servicing Corp., 521 Fifth Avenue, New York.

The erection of motor terminals will facilitate the dispatching, loading and unloading of freight and will also tend to decrease the traffic congestion in large cities, increase employment, improve trucking services and lower the cost of truck operation.

Motor carrier and interstate trucking rates are expected to receive an impetus toward downward revision when the cooperative plans of the group go into effect.

Inland Negotiating For Milcor Steel

INLAND STEEL CO. is negotiating for acquisition of the Milcor Steel Co., Milwaukee, manufacturer of hardware items and steel building products such as sheet steel roofing, metal lath, down spouts, eave troughs, ventilators, etc. The Milcor Steel Co. has assets of more than \$3,000,000 and operates a plant at Milwaukee and one at Canton, Ohio. It is the outgrowth of the former Milwaukee Corrugating Co., which was organized in 1902.

Whether Milcor will lose its identity if acquired by Inland, is undetermined. Precedence points to Inland's acquisition of Joseph T. Ryerson & Son, Inc., which name has been retained.

Foreclosure Against Newton is Planned

FORECLOSURE proceedings against the Newton Steel Co. are contemplated by the Republic Steel Corp., according to announcement made by Donald B. Gillies, president of the Newton company, at the annual meeting of Newton stockholders held in Cleveland, April 22. This action, Mr. Gillies said, was being considered in view of Newton's inability to make profits on its old type sheet mills because of competition of new continuous mills and the decline in sheet prices. The Newton company lost \$827,139 in 1935 and \$1,034,036 in 1934. Its Newton Falls plant has been shut down almost continuously since 1931 and its Monroe, Mich., plant has been unable to show a profit.

Republic owns all of Newton's \$3,866,000 first mortgage 7 per cent gold bonds, which are in default and in addition Newton, on Dec. 31 last, was indebted to Republic to the amount of \$1,799,822 on open account. Republic also owns a majority of Newton's common and preferred stock, which it acquired through the acquisition of the Corrigan, McKinney Steel Co.

Several minority stockholders questioned the necessity of foreclosure proceedings and formed a stockholders' committee to look after their interests.

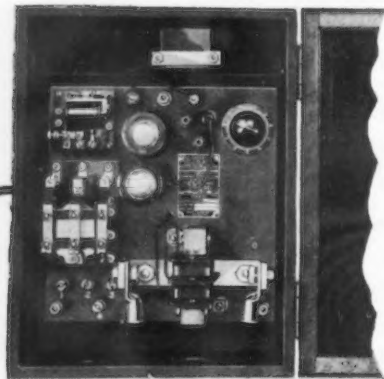
Iron Content of Ore Lower in 1935

THE average content of Lake ore in 1935 was 51.44 per cent iron natural, a slight decline from the previous year when the content was 51.49 per cent, according to the average analysis report of the Lake Superior Iron Ore Association. With the exception of an increase during 1932 and 1933 when iron ore shipments were light, the average content has not shown a very marked change during the past few years.

The average iron content of low phosphorus non-Bessemer ore last year was 51.15 per cent as compared with 51.06 per cent the previous year. The average iron content of Bessemer ore fell to 54.26 per cent from 54.70 per cent the previous year. High phosphorus non-Bessemer ore increased in iron content to 52.41 per cent from 51.96 per cent.

Ore mined in the Mesabi district last year had an average iron content of 51.23 per cent or the same as during the previous year.

EC&M AUTOMATIC WELD TIMERS



Standard EC&M Automatic Weld Timer. There are many other forms of these Timers for use with foot, air or hydraulically operated machines. Ask for Leaflet 1200 describing them.

For accurately controlling the number of Heat-units put into the weld—for increasing the output of welding machines—for avoiding discoloration and indentation of the work being welded, many firms have found that EC&M Automatic Weld Timers pay for themselves very quickly by making *Each Weld a Perfect Weld*.

If you are having difficulty in securing good welds, send samples of your material to-day and, without obligation, we will be glad to give you our recommendation for correcting the fault.

The EC&M Co. has a very interesting 24-page Booklet No. 142 which contains many helpful suggestions for proper welding procedure. Send for a copy to-day.

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COMING MEETINGS

Meetings in May

May 1 and 2. American Society for Metals. Second biennial interchapter meeting of Pittsburgh, Philadelphia, Lehigh Valley, York, Southern Tier and Penn State chapters. Nittany Lion Inn, State College, Pa. D. F. McFarland, Penn State College, State College, Pa., secretary of Penn State chapter.

o o o

May 4 to 9. American Foundrymen's Association. Annual convention and exposition. Convention Hall, Detroit. C. E. Hoyt, 222 West Adams Street, Chicago, executive secretary.

o o o

May 5. Gray Iron Founder's Society. Annual meeting. Hotel Statler, Detroit. W. W. Rose, 33 Public Square, Cleveland, executive vice-president.

o o o

May 5 to 8. American Institute of Architects. Annual convention. Chamberlin Hotel, Old Point Comfort, Va., and Williamsburg, Va. Charles T. Ingham, 1741 New York Avenue, N.W., Washington, secretary.

o o o

May 7 and 8. Iron and Steel Institute (British) Annual meeting. Institution of Civil Engineers, London. K. Headlam-Morley, 28 Victoria Street, London, S. W. 1, secretary.

o o o

May 9. Power Transmission Council and Mechanical Power Engineering Associates. Annual meeting. Ambassador Hotel, Atlantic City. Francis Juraschek, 1 Atlantic Street, Stamford, Conn., secretary.

o o o

May 9 and 10. American Institute of Chemists. Annual convention. Buffalo. Howard S. Neiman, 233 Broadway, New York, secretary.

o o o

May 11 to 13. American Supply and Machinery Manufacturers Association. Annual meeting. Ambassador Hotel, Atlantic City. R. K. Hanson, 604 American Bank building, Pittsburgh, secretary. Also Southern Supply & Machinery Distributors Association. Alvin M. Smith, Smith-Courtney Co., Richmond, Va., secretary.

o o o

May 11 to 15. American Mining Congress. Coal convention and exposition. Cincinnati.

o o o

May 28. American Iron and Steel Institute. Annual convention. Waldorf-Astoria Hotel, New York. Walter S. Tower, 350 Fifth Avenue, New York, executive secretary.

Again GENERAL ELECTRIC REDUCES PRICES ON MAZDA LAMPS

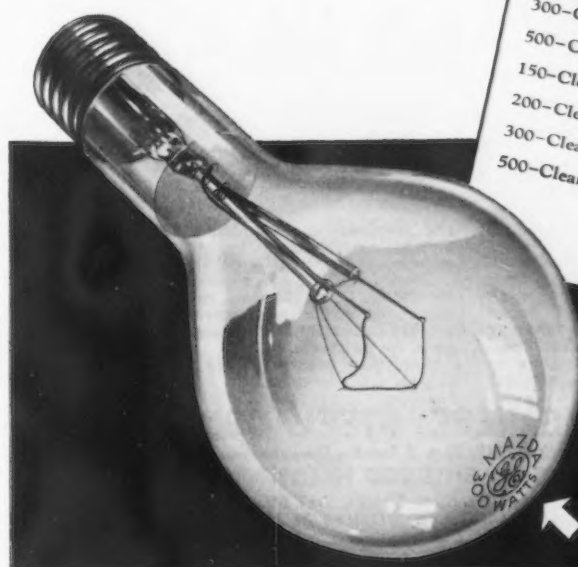
*Now you can have Better
Lighting for less cost in
your plant, factory, office*

General Electric's announcement of substantial price reductions in the higher wattage types of MAZDA lamps (effective May 1st) now makes it possible for every plant, factory, and office to enjoy the advantages of better lighting at lower cost than ever before. This is the eighteenth major reduction in MAZDA lamp prices in fifteen years.

In every way, these price reductions offer you advantages toward bringing lighting standards up to the minimum requirements for efficient, safe seeing. They make your lighting costs lower than ever.

Phone or write the jobber who serves you with MAZDA lamps made by General Electric and order an ample supply of the higher wattage sizes at these new low prices. General Electric Co., Nela Park, Cleveland, Ohio.

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The price of MAZDA lamps has gone steadily down while lamp efficiency, the amount of light produced per unit of current, has gone up and up . . . The (GE) trade-mark on each lamp means they Stay Brighter Longer!



NEW LOW PRICES (Effective May 1st)		
Watts	Type	Was Now
150	Clear	35c- 25c
	Inside Frosted	
200	Clear	55c- 45c
300	Clear	90c- 75c
500	Clear	\$1.55-\$1.40
150	Clear Daylight	65c- 50c
200	Clear Daylight	90c- 80c
300	Clear Daylight	\$1.35-\$1.20
500	Clear Daylight	\$2.30-\$2.15

THEY STAY
BRIGHTER
LONGER

Concrete Reinforcing Steel Institute Meets at Hot Springs, Va.

EW. LANGDON, of Joseph T. Ryerson & Son, Inc., Chicago, and Hugh J. Baker, of Hugh J. Baker Co., Indianapolis, were reelected president and treasurer respectively of the Concrete Reinforcing Steel Institute at twelfth annual meeting at The Hot Springs, Va., April 20 to 22. Other officers are Kenneth Mann, Truscon Steel Co., and J. F. Curley, Concrete Steel Co., vice-presidents, and W. H. Thompson, secretary.

A serious jobber problem exists today in the reinforcing steel industry as a result of the removal of possible control under the NRA code, according to N. J. Clarke, vice-president in charge of sales, Republic Steel Corp., Cleveland, who made the opening address at the convention.

Mr. Clarke said that Republic desires jobbers to make a reasonable profit, but that without the

assistance and cooperation of others in the reinforcing steel business little could be done to alter the unsatisfactory conditions of the past few months.

He attributed this problem to the new methods of marketing developed under the steel code and to the widespread publicity given complicated business details which encouraged many concerns never before interested in reinforcing bars to enter that field. He said that closer cooperation between mills and distributors was the only way the industry can meet these conditions.

Mr. Clarke also pointed out that although reinforcing bars had changed from an engineering product to a commodity product, the complete price demoralization which accompanied the change had no justification whatsoever.

The statement that independent fabricators will soon be eliminated

due to the strenuous competition from mills and mill-owned subsidiaries was objected to by Mr. Clarke who said a definite place existed in the industry for such concerns.

Marketing problems in the reinforcing bar industry were discussed by O. W. Irwin, manager, concrete bar bureau, Carnegie-Illinois Steel Corp. The industry was visualized as now being in its fourth decade. The first was a period of development and the second of standardization. Profitless prosperity characterized the third decade, and the last or present period was called one of integration and diversification.

Mr. Irwin indicated the necessity of some sales system which would do away with the evils of bidding in lump-sums and the combination and contingent bid. The constant friction between dealers in billet bars, rail bars and axle bars must be eliminated if there is to be harmony in the industry as a whole. More uniformity in selling outlets must be discovered by "the Moses who is to lead this industry out of the wilderness" as Mr. Irwin terms the one who will be able to answer all the problems now facing those in the reinforcing field.

AMSCO MANGANESE STEEL *Double Wall* CRANE WHEELS

*are strikingly
Economical*

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Because the tread quickly assumes a high polish, minimizing wear on run-way tracks and wheels.

Because the tread wears very slowly and evenly, seldom developing surface cracks or flat spots.

Because the wheel flanges of tough, strong Manganese Steel seldom bend or fracture.

Because the wheel is uniformly tough and strong throughout.

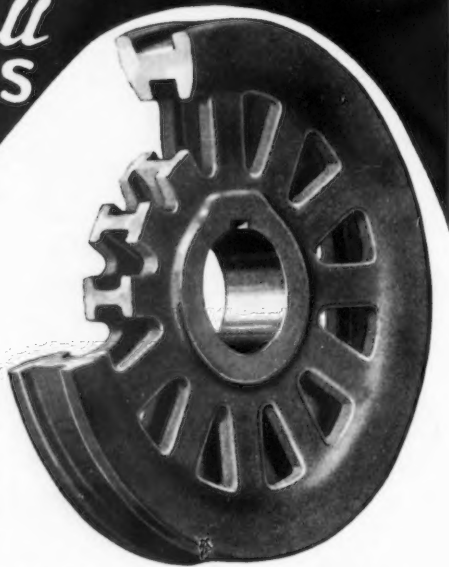
Because the quickly acquired tread hardness is constantly self-renewing and is more durable than any "surface-hardened" steel.

Because the new double wall design eliminates the possibility of web breakage at flange or hub; insures perfect heat-treatment in manufacture; and gives in combination with the toughness, strength

and wear-resistance of Manganese Steel, a wheel unsurpassed in long life and economy.

Specify AMSCO Manganese Steel Double Wall Crane Wheels for your new cranes, and for replacements on your present equipment. They are made in all sizes, for all cranes.

Send your inquiry to the manufacturer of your crane or to us.



AMERICAN MANGANESE STEEL COMPANY

Division of American Brake Shoe & Foundry Company

375 EAST 14th STREET, CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif. • Offices in Principal Cities

Armco Middletown Workers Trained in First Aid

THE Middletown, Ohio, plant of the American Rolling Mill Co., is the first steel plant employing over 4000 men in the entire United States to be completely trained in the use of first aid under the direction of the U. S. Bureau of Mines, Pittsburgh.

Starting last fall, classes in first aid were inaugurated under the direction of a special instructor from the bureau. An instructors' course qualified a group of 60 picked men to act as instructors for the rest of the organization. Classes numbering 25 men to a unit swung into action throughout the plant, and hundreds of men completed the course of training each successive week.

Every official, every superintendent, every foreman, and every member of the plant has now finished the course, passed the examination and received his certificate from the Bureau of Mines.

In all, 4199 employees have taken the training. Because of its accomplishment the Middletown Armco plant itself will receive a certificate from the bureau.



PERSONALS

CHARLES A. CHAYNE, former assistant chief engineer at Buick Motor Co., has been appointed chief engineer to succeed F. A. BOWER, who has been granted an indefinite leave of absence because of ill health. Mr. Chayne has been with Buick since January, 1930, going



C. A. CHAYNE

to the company from the Marmon Motor Car Co. at Indianapolis, where he was an engine designer. For nine months during 1927 he was also associated with the Locomotive Mfg. Co. Up until that time he taught automotive engineering at Massachusetts Institute of Technology, from which he was graduated in 1919 with a degree in Mechanical Engineering.

J. W. LEWIS, who since 1923 has been assistant to GERARD SWOPE, president of the General Electric Co., has been elected treasurer, succeeding R. S. MURRAY, who is retiring on May 1 because of ill health.

H. A. LARSEN, heretofore manager of structural products on the Pacific Coast for the Wickwire Spencer Steel Co., New York, has been made Pacific Coast manager of the company. He first joined the company in 1922 and resigned two years later to take charge of operations on the Pacific Coast for the National Steel Fabric Co., a subsidiary of the Pittsburgh Steel Co. In January, 1934, he returned to the Wickwire company in the position he held prior to his recent promotion.

W. J. BUCKLEY, for the past 17 years identified with the Chapman-Valve Mfg. Co., Indian Orchard, Mass., has been made manager of the Pittsburgh office of J. W. Mull, Jr., Indianapolis, Ind. He succeeds M. Thomas Knott, who has joined the organization of the Buffalo Forge Co.

HARRY HARDWICKE, who has been associated with the tool steel industry in the Chicago district for the past 21 years, has been appointed

district sales manager of the La-trobe Electric Steel Co., Chicago.

A. E. DRISSNER, vice-president and chief engineer of the National Acme Co., Cleveland, sailed for Europe on April 23.

W. G. WINSHIP, Foote-Burt Co., has been elected president of the Purchasing Agents Association of Cleveland, Inc., for the ensuing



Our laboratory, where materials are tested to maintain GREAT LAKES standard of quality and service, and through research to anticipate requirements of foundries in their effort to produce better castings.

Bonds of Friendship

"Business is business"—but business without joy, without the desire to create bonds of friendship based on mutual service, is worthless. It cannot survive.

The persistent growth of our business since its inception in 1918 is due primarily to bonds of friendship founded on confidence. Confidence in quality of our materials, the prices at which they are sold and the complete service behind them.

At the A. F. A. Convention in Detroit, May 4 to 9, we anticipate the pleasure of greeting visiting foundrymen—our friends! Meet us at our exhibit, Booth 425, and before you leave the city come up to our offices and look us over—in the United Artists Building, just a step from the Statler.

Great Lakes Foundry Sand Co.

United Artists Bldg.

Detroit, Michigan

Miners—Processors—Foundry, Metallurgical and Sand Blast Service



year. Other new officers are: F. J. MEKET, Aluminum Co. of America, first vice-president; CHARLES O'BRIEN, Grabler Mfg. Co., second vice-president; GEORGE A. COLLIER, Cleveland Automatic Machine Co., secretary-treasurer, and JAMES E. O'BRIEN, Fanner Mfg. Co., national director. DAVID EVANS, Leece-Neville Co., FRANK ANDERSON, National Malleable & Steel Castings Co., and VINCE CADA, Eaton Mfg. Co., have been elected directors.

WILLIAM MCBRIDE has been appointed vice-president in charge of sales for Pittsburgh Steel Foundry Corp., Glassport, Pa., with headquarters in the Union Brank Building, Pittsburgh. Mr. McBride, who has had many years' experience in the steel business, was the organizer and principal owner of the Fort Pitt Spring & Mfg. Co., McKees Rocks, Pa., until 1928, when he sold the company. He was graduated from Rensselaer Polytechnic Institute in 1899.

L. E. MUSTARD, for the past three years sectional sales and service engineer, with headquarters in Dallas, Tex., for the Bristol Co., Waterbury, Conn., has been appointed district manager of the company's Detroit office. He joined



L. E. MUSTARD

"A.W." ROLLED STEEL FLOOR PLATE

Diamondette pattern shown actual size.



Available also in Super-Diamond, Diamond, and other patterns.

LOW FIRST COST—NO MAINTENANCE COST

Quick installation without disturbing men or production. Cut to any required shape. Slip proof, oil proof, heat proof, crack proof. Toughest traffic can't damage or impair it. PERMANENT. Immediate delivery, in various patterns to meet all requirements.

ALAN WOOD STEEL COMPANY CONSHOHOCKEN, PA.

BRANCHES:

Philadelphia, New York, Boston, Los Angeles, San Francisco, Seattle, Houston

110 YEARS' IRON- AND STEEL-MAKING EXPERIENCE



the sales staff of the company in 1923 and has been associated with the Pittsburgh, Denver and St. Louis offices.

♦ ♦ ♦

NEIL METCALF, for the past eight years metallurgist for the Treadwell Engineering Co., Easton, Pa., has resigned to join the staff of the Burlington Steel Co., Ltd., Hamilton, Ont., in a similar capacity. He is a graduate in metallurgy from the University of Wales, Cardiff, Wales, and was formerly identified with the Ford Motor Co.

♦ ♦ ♦

GEORGE CODRINGTON has been elected a director of the National Acme Co., Cleveland, to fill the vacancy caused by the recent death of Frank H. Hobson. Mr. Codrington is president of the Winton Engine Corp., Cleveland, and a director of Addressograph-Multi-graph Corp., Cleveland, and of the Electro-Motive Corp., LaGrange, Ill.

♦ ♦ ♦

WALTER L. TOY, of New York, has been made president of Scott & Williams, Inc., Laconia, N. H., to succeed the late Harry Swinglehurst.

♦ ♦ ♦

C. H. TATE has become Cleveland district representative, with office at 1740 East Twelfth Street, Cleveland, for the Northern Equipment Co., Erie, Pa. F. W. Bunting and Harold A. Schleider have joined the engineering department of the company as inspection engineers.

JAMES L. LUKE has been elected treasurer of Cleveland Cliffs Iron Co., Cleveland, to fill the vacancy caused by the death last July of Charles G. Heer. Mr. Luke has been assistant vice-president of the Cleveland Trust Co. and has a considerable banking and financial experience. D. R. FOREST has been elected assistant treasurer, a newly created office. STEELE MITCHELL, vice-president, Adams Express Co., has been elected a director to fill the vacancy created by the death of William P. Belden. Mr. Mitchell represents a large block of stock in the company recently purchased for the Adams Express Co. and other allied interests in New York.



FRANK G. STEINEBACH, managing editor of *Foundry*, Cleveland, has been nominated for chairman of the North Eastern Ohio chapter of the American Foundrymen's Association. B. G. PARKER, president, Youngstown Foundry & Machine Co., Youngstown, has been nominated vice-chairman, and RUSSELL F. LINCOLN, assistant sales manager, Machine Division of Osborn Mfg. Co., Cleveland, has been nominated secretary-treasurer. For directors for three years WALTON L. WOODY, retiring chairman, HOMER BRITTON, Cleveland Cooperative Stove Co., Cleveland, and E. F. HESS, Ohio Injector Co., Wadsworth, Ohio, have been nominated and for one year, O. J. WARD HENRY, Electro Alloys Co., Elyria, Ohio.



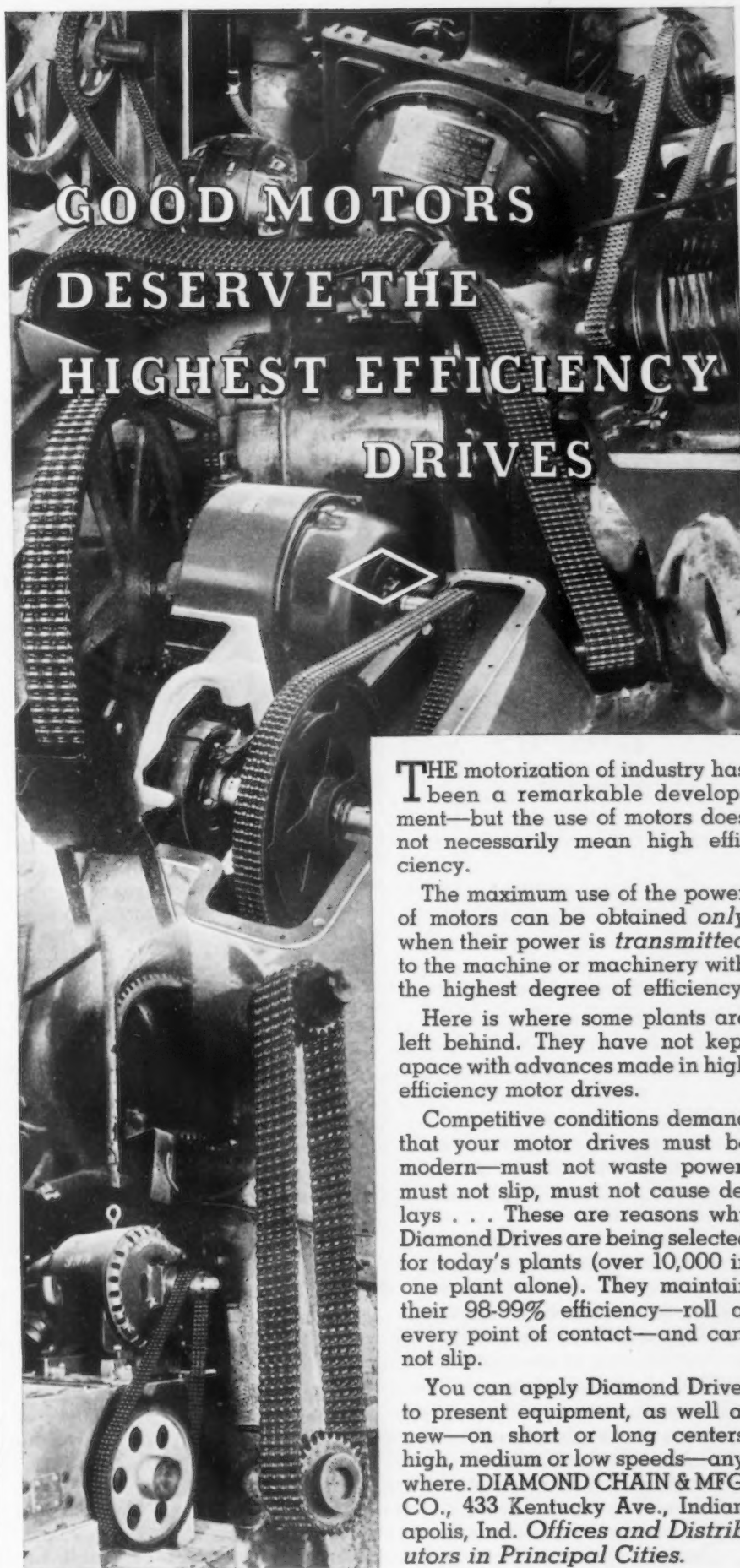
HARRY VOGELSONG has been appointed sales manager for Follansbee Brothers Co., Pittsburgh, to succeed WILLIAM H. LAKE, who has resigned.

OBITUARY

WALTER D. DOUTHITT, general superintendent of the Pittsburgh Rolls Corp., Pittsburgh, died at his home in that city on April 22, aged 55 years. He began his career with the Garrison Foundry, South Side, Pittsburgh, later being employed as roll expert at the Mesta Machine Co. He was nationally known as an expert on heavy steel roll equipment.



JULIUS KATELMAN, founder and owner of the Council Bluffs Junk Co., Council Bluffs, Iowa, died at his home in that city on April 17, aged 62 years.



THE motorization of industry has been a remarkable development—but the use of motors does not necessarily mean high efficiency.

The maximum use of the power of motors can be obtained *only* when their power is *transmitted* to the machine or machinery with the highest degree of efficiency.

Here is where some plants are left behind. They have not kept apace with advances made in high efficiency motor drives.

Competitive conditions demand that your motor drives must be modern—must not waste power, must not slip, must not cause delays . . . These are reasons why Diamond Drives are being selected for today's plants (over 10,000 in one plant alone). They maintain their 98-99% efficiency—roll at every point of contact—and cannot slip.

You can apply Diamond Drives to present equipment, as well as new—on short or long centers, high, medium or low speeds—anywhere. DIAMOND CHAIN & MFG. CO., 433 Kentucky Ave., Indianapolis, Ind. *Offices and Distributors in Principal Cities.*

DIAMOND MOTOR DRIVES

THE EFFICIENCY OF MOTORIZED MACHINERY DEPENDS ON THE DRIVES

THE IRON AGE, April 30, 1936—71



... Rise in steel output is resumed, with production up one point to 69 per cent of capacity.

o o o

... Four months' lettings of construction steel are 30 per cent ahead of corresponding 1935 period.

o o o

... Scrap markets ease off with THE IRON AGE composite down to \$14.54.

STRONG and diversified demand for practically all forms of steel has accelerated the upward trend of ingot production which was temporarily checked last week. Raw steel output this week is at 69 per cent of capacity, a gain of one point.

Apparently no ingots are being stocked, but at some plants where production was curtailed by the March floods, depleted inventories are still being replenished. This is particularly true in the Wheeling district, where operations have risen to 90 per cent of capacity. Output is up one point at Pittsburgh and in the Valleys and has also been raised at Buffalo. The important Chicago and Philadelphia districts are unchanged and a decline of three points has been registered at Cleveland.

INTERESTING changes in the character of finished steel demand are apparent. At Chicago, where bars have recently been the principal outlet for steel, structural shapes are now the outstanding item. Northern Ohio mills report a slight curtailment in demand for sheets and strip steel, but movement of bars is unabated.

Orders for bars, plates, shapes, pipe and railroad materials during April are exceeding March totals in most instances, but in the case of lighter steel products the reverse is true. Tin plate is an exception, as the usual seasonal increase in demand has been in line with expectations. Jobbers' business is reported to be favorable in all parts of the country, indicating heavier purchases by farmers, small manufacturers and the building industry.

THE Chesapeake & Ohio has issued formal inquiries for 5400 freight cars and the Pere Marquette will buy 500 automobile cars. The Grand Trunk Western will purchase 200 units and repair 950 in its own shops. The New Haven will make repairs and alterations to 2500 hoppers, and the Lehigh Valley has placed steel for repairs to 2000 cars. A large Eastern carrier is considering the purchase of locomotives.

WHILE public works projects have not been dominant in recent structural steel activity, the week's new inquiries of 41,800 tons include 12,000 tons for a bridge at Far Rockaway, N. Y., and 10,000 tons for a bridge at Port Arthur, Tex. New fabricated structural projects reported this week and last call for a total of 70,000 tons of steel. Current awards, however, dropped to 14,125 tons from 20,000 tons in the preceding week.

Total lettings of construction steel as reported by THE IRON AGE in the first four months of the year amounted to 596,700 tons, compared with 459,700 tons in the corresponding 1935 period. While the aggregate gain was only 30 per cent, it is estimated that private projects have more than doubled. These figures do not include relatively small projects, which have also been far more numerous this year than last.

AUTOMOBILE production passed the 120,000-unit mark last week and is apparently leveling off. However, retail sales seem to justify an output of 100,000 cars a week through May. Much steel is yet to be bought for next month's production and the recent lull in purchases is soon expected to end.

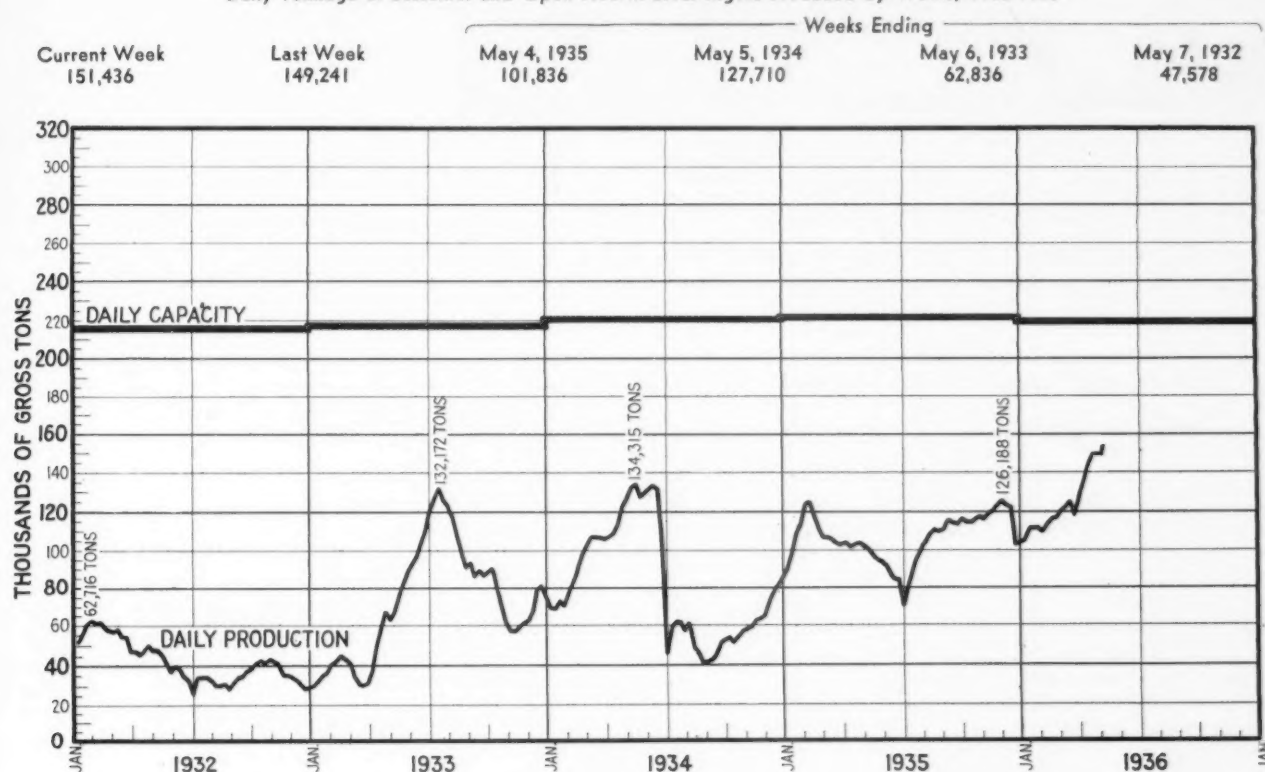
Tractor plants are booked at capacity for at least six weeks and production of farm implements is still being sustained. Agricultural demand for steel products generally is at a high rate.

Machine tools and machinery makers are taking large tonnages of steel. The volume of active inquiry for equipment is said to be the largest in the history of the machine tool industry, but much of this business is being held back by inadequate financing facilities.

THE scrap market has developed definite signs of weakness and THE IRON AGE composite price of No. 1 heavy melting steel has declined from \$14.63 a gross ton to \$14.54. The pig iron composite is holding at \$18.84 a gross ton, and the finished steel index is unchanged at 2.097c. a lb.

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936



STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ending April 4, 1936	May 4, 1935	May 5, 1934
Pittsburgh	65.0	64.0	51.0	35.0	47.0
Chicago	67.0	67.0	68.5	52.0	61.0
Valleys	74.0	73.0	67.0	51.0	62.0
Philadelphia	45.0	45.0	42.0	32.0	43.0
Cleveland	76.0	79.0	82.0	48.0	67.0
Buffalo	65.0	60.0	55.0	27.0	70.0
Wheeling	90.0	82.0	76.0	77.0	79.0
Southern	67.0	67.0	67.0	55.5	58.0
Ohio River	85.0	81.5	76.0	70.0	65.0
Western	90.0	90.0	70.0	30.0	35.0
St. Louis	80.0	80.0	80.0	37.0	60.0
Detroit	100.0	100.0	100.0	95.0	100.0
Eastern	90.0	90.0	70.0	35.0	55.0
Aggregate	69.0	68.0	62.5	46.0	58.0
Average Year to Date	57.0	56.3	53.9	48.6	43.6

Weekly Booking of Construction Steel

FROM THE IRON AGE

	Week Ended Apr. 28, 1936	Apr. 21, 1936	Mar. 31, 1936	Apr. 30, 1935	Year to Date 1936	1935
Fabricated structural steel awards.....	14,125	20,000	17,150	15,250	346,385	282,750
Fabricated plate awards.....	8,675	3,230	510	500	98,150	64,420
Steel sheet piling awards.....	0	0	160	0	15,405	13,765
Reinforcing bar awards.....	2,850	7,150	8,500	2,800	136,765	98,790
Total Lettings of Construction Steel..	25,650	30,380	26,320	18,550	596,705	459,725



... Pittsburgh district steel production rises to 65 per cent; Wheeling output hits 90 per cent.

o o o

... Demand well distributed among consuming industries.

o o o

... Tone of scrap market is weaker.

PITTSBURGH, April 28.—Steel ingot output in the Pittsburgh district has moved fractionally higher to 65 per cent of capacity, with the Wheeling district showing an eight-point rise to 90 per cent. There is ample evidence that steel being turned out is going into immediate consumption, since mills in most every case are being pushed for shipment.

The high level at which some manufacturing industries are operating has necessitated considerable repairs and rehabilitation to plants and machinery idle over a long period. Some of the increased bar business has no doubt resulted from this feature, since much machinery was "robbed" of parts to maintain operating plants in good order.

While there may be a tendency for production in this district to level off, there is still no evidence of any drastic curtailment in the picture since calls for all types of steel are appearing in steady volume. Demand for hot-rolled bars is maintaining its recent trend and is getting its support from the automotive industry and miscellaneous sources. Cold-finished material still continues to move satisfactorily, with implement makers' requirements giving good support. Production and shipments of reinforcing steel are holding up, with no immediate signs of let-up, since releases are being received daily on specific jobs. Steel sheet piling business will receive an impetus soon as the result of bids received by the Northern Indiana Public Service Co. at Michigan City, Ind., for the construction of a bulkhead requiring about 1000 tons. Move-

ment of plates and shapes is progressing in a satisfactory manner, with orders from car builders being filled. Structural inquiries this week are dominated by private projects, outstanding of which is a job requiring 2800 tons to be used in constructing a warehouse and office building. Signs of a better tone in the building industry are discernible in the slow but progressive improvement in demand for standard pipe.

Specifications for sheets during the past week have shown further improvement, and operations are at approximately 75 per cent of capacity. No unusual signs of activity are present in the ordering and shipping of strip steel, while requirements for tin plate from packers are steadily increasing. Both general line can and "beer plate" are holding up well, and production this week is at approximately 90 per cent.

There is a better tone in pig iron demand since many consumers have used up stocks of material bought at lower prices. Movement of industrial coke due to increased blast furnace and foundry activity continues brisk.

Pig Iron

Production of pig iron so far this month is progressing at a better rate than in the same period during March. Largely as a result of increased foundry activity and the fact that many buyers have reduced stocks of iron bought at lower prices, demand for pig iron is improving. Orders are being received from radiator and sanitary ware manufacturers.

However, the usual practice of ordering in carload lots still exists.

Semi-Finished Steel

Demand for semi-finished steel is holding up well, with a good movement in sheet bars and re-rolling billets. The stable finishing mill rate in many of the non-integrated mills is responsible for the continuous flow of bookings placed by these interests.

Bolts, Nuts and Rivets

Production in this market is continuing at a fairly active rate. Demand, coming in at a good volume over the past few weeks, is being sustained. Quite a bit of tonnage is going to automotive industries, and there is a fair amount of material going into railroad building. Miscellaneous bookings are holding up well.

Bars

The recent improvement in demand for hot-rolled bars continues, with specifications being placed by automotive interests and miscellaneous sources. Although the aggregate tonnage from car makers has leveled off slightly, demand from other buyers is making up the slight deficiency. Mills are being pushed for shipment of material, signifying that the steel is going into immediate consumption.

Reinforcing Steel

Mild weather is still responsible for the increasingly large number of releases on reinforcing steel for specific jobs. This tendency is increasing, and mills will no doubt be extremely busy in the near future producing and shipping these tonnages. Many new jobs are still in the blue print stage, and as a result new specifications are light.

Cold-Finished Steel Bars

Aggregate demand for cold-finished material so far this month compares favorably with the same period in March. While there may possibly be a leveling off of orders from automotive interests, this will no doubt last only until final preparations have been made for new models. A bright spot in this market continues to be the satisfactory demand from implement makers and manufacturers of household utilities. Production of the latter seems to be far better than that experienced during the same time last year.

Steel Sheet Piling

Demand and production of steel sheet piling progresses on a more or less piecemeal basis. Many jobs, such as the All-American Canal at Potholes, Cal., are requiring steel in small lots of 100 to 150 tons. Bids were received on April

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Apr. 28, 1936	Apr. 21, 1936	Mar. 31, 1936	Apr. 30, 1935
No. 2 fdy., Philadelphia.....	\$21.3132	\$21.3132	\$21.3132	\$20.26
No. 2, Valley furnace.....	19.50	19.50	19.50	18.50
No. 2 Southern, Cin'ti.....	20.2007	20.2007	20.2007	19.13
No. 2, Birmingham†.....	15.50	15.50	15.50	14.50
No. 2 foundry, Chicago*.....	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.....	20.8132	20.8132	20.8132	19.76
Basic, Valley furnace.....	19.00	19.00	19.00	18.00
Malleable, Chicago*.....	19.50	19.50	19.50	18.50
Malleable, Valley.....	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago.....	25.2528	25.2528	25.2528	24.2528
Ferromanganese, seab'd car- lots.....	75.00	75.00	75.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chi-
cago district is 60c. per ton.

Finished Steel

Per Lb.:	Apr. 28, 1936	Apr. 21, 1936	Mar. 31, 1936	Apr. 30, 1935
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.40	2.40	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	2.50	2.50	2.50	2.50
Sheets, galv., No. 24, P'gh...	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, Gary...	3.20	3.20	3.20	3.20
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.85
Hot-rolled sheets No. 10, Gary	1.95	1.95	1.95	1.95
Wire nails, Pittsburgh.....	2.10	2.10	2.10	2.60
Wire nails, Chicago dist. mill	2.15	2.15	2.15	2.65
Plain wire, Pittsburgh.....	2.40	2.40	2.30	2.30
Plain wire, Chicago dist. mill	2.45	2.45	2.35	2.35
Barbed wire, galv., P'gh....	2.60	2.60	2.50	3.00
Barbed wire, galv., Chicago dist. mill.....	2.65	2.65	2.55	3.05
Tin plate, 100 lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$5.25

Scrap

Per Gross Ton:	Apr. 28, 1936	Apr. 21, 1936	Mar. 31, 1936	Apr. 30, 1935
Heavy melting steel, P'gh...	\$15.75	\$15.75	\$15.75	\$11.50
Heavy melting steel, Phila...	13.50	13.75	13.75	10.00
Heavy melting steel, Ch'go...	14.37 1/2	14.37 1/2	14.75	9.75
Carwheels, Chicago.....	14.00	14.00	14.00	10.50
Carwheels, Philadelphia....	14.50	14.75	14.75	11.25
No. 1 cast, Pittsburgh.....	15.25	15.25	15.25	12.25
No. 1 cast, Philadelphia.....	14.00	14.25	14.25	11.00
No. 1 cast, Ch'go (net ton)...	12.50	12.50	13.00	9.00
No. 1 RR. wrot., Phila.....	15.00	15.00	13.25	10.25
No. 1 RR. wrot., Ch'go (net)	12.50	13.00	13.25	8.00

Rails, Billets, etc.

Per Gross Ton:	Apr. 28, 1936	Apr. 21, 1936	Mar. 31, 1936	Apr. 30, 1935
Rails, heavy at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh.....	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh..	28.00	28.00	28.00	27.00
Sheet bars, Pittsburgh.....	28.00	28.00	28.00	28.00
Slabs, Pittsburgh.....	28.00	28.00	28.00	27.00
Forging billets, Pittsburgh...	35.00	35.00	35.00	32.00
Wire rods, Nos. 4 and 5, P'gh	38.00	38.00	38.00	38.00
Skelp, grvd. steel, P'gh, lb...	1.80	1.80	1.80	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.85	1.85	1.85	1.80
Bars, Chicago.....	1.90	1.90	1.90	1.85
Bars, Cleveland.....	1.90	1.90	1.90	1.85
Bars, New York.....	2.20	2.20	2.20	2.15
Plates, Pittsburgh.....	1.80	1.80	1.80	1.80
Plates, Chicago.....	1.85	1.85	1.85	1.85
Plates, New York.....	2.09	2.09	2.09	2.0926
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.80
Structural shapes, Chicago...	1.85	1.85	1.85	1.85
Structural shapes, New York...	2.06 1/4	2.06 1/4	2.06 1/4	2.063175
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.95
Hot-rolled strips, Pittsburgh...	1.85	1.85	1.85	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Coke, Connellsville

Per Net Ton at Oven:	Apr. 28, 1936	Apr. 21, 1936	Mar. 31, 1936	Apr. 30, 1935
Furnace coke, prompt.....	\$3.65	\$3.65	\$3.65	\$3.85
Foundry coke, prompt.....	4.25	4.25	4.25	4.60

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	9.50	9.50	9.25	8.75
Lake copper, New York.....	9.62 1/2	9.62 1/2	9.37 1/2	9.12 1/2
Tin (Straits), New York....	46.80	46.87 1/2	47.20	50.75
Zinc, East St. Louis.....	4.90	4.90	4.90	4.10
Zinc, New York.....	5.27 1/2	5.27 1/2	5.27 1/2	4.45
Lead, St. Louis.....	4.45	4.45	4.45	3.60
Lead, New York.....	4.60	4.60	4.60	3.75
Antimony (Asiatic), N. Y....	13.50	13.50	13.50	14.25

The Iron Age Composite Prices

Finished Steel

April 28, 1936	2.097c. a Lb.
One week ago	2.097c.
One month ago	2.084c.
One year ago	2.124c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

	HIGH	LOW
1936.....	2.130c., Jan. 7	2.084c., Mar. 10
1935.....	2.130c., Oct. 1	2.124c., Jan. 8
1934.....	2.199c., April 24	2.008c., Jan. 2
1933.....	2.015c., Oct. 3	1.867c., April 18
1932.....	1.977c., Oct. 4	1.926c., Feb. 2
1931.....	2.037c., Jan. 13	1.945c., Dec. 29
1930.....	2.273c., Jan. 7	2.018c., Dec. 9
1929.....	2.317c., April 2	2.273c., Oct. 29
1928.....	2.286c., Dec. 11	2.217c., July 17
1927.....	2.402c., Jan. 4	2.212c., Nov. 1

Pig Iron

\$18.84 a Gross Ton
18.84
18.84
17.90

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1936.....	\$18.84, Jan. 7	\$18.84, Jan. 7
1935.....	18.84, Nov. 5	17.83, May 14
1934.....	17.90, May 1	16.90, Jan. 27
1933.....	16.90, Dec. 5	13.56, Jan. 3
1932.....	14.81, Jan. 5	13.56, Dec. 6
1931.....	15.90, Jan. 6	14.79, Dec. 15
1930.....	18.21, Jan. 7	15.90, Dec. 16
1929.....	18.71, May 14	18.21, Dec. 17
1928.....	18.59, Nov. 27	17.04, July 24
1927.....	19.71, Jan. 4	17.54, Nov. 1

Steel Scrap

\$14.54 a Gross Ton
14.63
14.75
10.42

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1936.....	\$14.75, Feb. 25	\$13.33, Jan. 7
1935.....	13.42, Dec. 10	10.33, April 23
1934.....	13.00, Mar. 13	9.50, Sept. 25
1933.....	12.25, Aug. 8	6.75, Jan. 3
1932.....	8.50, Jan. 12	6.43, July 5
1931.....	11.33, Jan. 6	8.50, Dec. 29
1930.....	15.00, Feb. 18	11.25, Dec. 9
1929.....	17.58, Jan. 29	14.08, Dec. 3
1928.....	16.50, Dec. 31	13.08, July 2
1927.....	15.25, Jan. 11	13.08, Nov. 22

27 by the Northern Indiana Public Service Co. at Michigan City, Ind., for the construction of a bulkhead, involving approximately 1084 tons of steel sheet piling.

Plates and Shapes

Present and future prospects for heavy materials are looking bright. Increased specifications from railroad car builders, coupled with a fair amount of tonnage for plates to be used in fabricated pipe lines, are some of the features in the heavy steels picture. Bookings of steel for material used in barge making has leveled off a little.

The main feature of structural inquiries this week seems to be the predominance of private projects. Outstanding are 2800 tons to be used in constructing a warehouse and office building for the Westinghouse Electric & Mfg. Co. at Mansfield, Ohio, and 710 tons applicable to alterations to a brewery in New York. Quite a heavy amount of material is being asked for the construction of a nurses home in Brooklyn, and a vocational school building in Philadelphia. This week's awards are, on the whole, State projects, practically all of the material going for highway bridges.

Tubular Products

The good volume of specifications for oil-country goods experienced by producers during March continues to hold up this month, and there are signs of further improvement. The small but noticeable improvement in standard

pipe, resulting in a large measure from rehabilitation work, is continuing. Bookings for mechanical tubing from automobile makers and miscellaneous sources are coming in fairly steadily. While the aggregate buying of tubular products is not in any great amount, the consistent increase in business over the past few months is encouraging to producers.

Wire Products

This market continues fairly steady, with no outstanding activity. Movement of wire fence has run into a temporary lull, due in a large measure to the fact that the farmers are busy getting in their spring plowing and planting. Prices for wire products are firm.

Sheets

Operations in the sheet industry this week are approximately the same as reported a week ago. Specifications have shown further improvement during the past week, with the bulk of business going into unclassified tonnage. An interesting feature is the requiring of high tensile sheets to be used for roofing for some railroad freight cars under construction. These high tensile sheets will be galvanized. Demand from automotive interests is at about the same rate as in the last few weeks.

Tin Plate

Tin plate production this week remains at approximately 90 per cent of capacity. Packers' requirements are steadily increasing, and the latter seem to be optimistic

in regard to this year's crop. Quite a little tonnage is being booked by makers of cans to be used for condensed milk. Bookings for general line can material are holding up well, with a fair tonnage going to paint can manufacturers. While it is true that some stocks are being augmented, due to the high operating rate, nevertheless much of this material will be moving out of the mills within a very short time.

Strip Steel

Production of hot-rolled strip is maintaining its recent pace. There is not much activity in demand when compared with last month. However, orders from miscellaneous sources are holding up well, and a slight leveling off occurring in business from automobile parts makers is expected to be of a temporary nature.

Coal and Coke

Movement of industrial coke is still continuing at a brisk rate due to increased blast furnace activities and a better operating rate at foundries. Some steel companies recently purchased beehive coke for blast furnaces. Not being sure how long the increased blast furnace activity would last, they did not wish to put in additional by-product ovens until the trend was more discernible. With cement manufacturers having become more active, accumulations of slack are being steadily reduced, and since no domestic lump coal is being moved it may be necessary soon to resort to crushing operations.

Automobile Official Addresses Engineers

CHARLES E. WILSON, vice-president, General Motors Corp., Detroit, and member of the executive committee, addressed the Aliquippa Engineers Institute of the Jones & Laughlin Steel Corp. at the April 15 meeting at Aliquippa, Pa. Mr. Wilson's address entitled "Engineering and Social Progress" presented a résumé of some of the more notable engineering developments of the last 50 years which have advanced social progress and welfare.

Fine quality sheets which may be used for special purposes such as body building and the making of furniture is the only product in which the United States appears able to compete in the markets of the Netherlands, according to the Commercial Attache's office in The Hague. It is believed that activity in this connection is likely to increase, thus affording a larger market.



CHICAGO



... Steel production levels off at 67 per cent of capacity.

... Demand for structural steel improves; plates still rather dull.

... Agricultural demand unabated with no signs of falling off in sight.

CHICAGO, April 28. — Steel output has leveled at 67 per cent of capacity and most signs point to little change from this figure in the near future. Both sales and specifications are steady, but there is significance in the changes of their character. For instance, demand for structurals has, for the first time in many months, climbed above the movement of bars, and railroad equipment is lending good support to the plate market.

Of great importance is the growing use of steel mill products in farm areas. Jobbers are distributing large quantities of wire products, tractor plants are still engaged at capacity with well-arranged schedules for the next six weeks and orders for harvesting equipment are in exceptional volume.

Rail buying this year has already exceeded the total in 1935 and producers consider the outlook favorable for a substantial secondary buying movement. The only blots on the business picture, as seen by Chicago business men, are the constant threat of higher taxes and the political question.

Scrap prices are definitely leaning to the weaker side and the prediction has been made by steel officials that heavy melting steel will sag to less than \$14 a ton. Supplies are adequate for all needs, and if ingot output has reached its spring top, then sellers in this market will be forced to acknowledge that they are confronted by a new picture.

Pig Iron

It is estimated that foundries in the Chicago area are engaged at 80

per cent of capacity and the outlook for the immediate future is good. April shipments of pig iron are 10 per cent below March, when old commitments were cleaned up. Melters' stocks are now low, as indicated by the volume of spot sales, and it is expected that shipments may climb in May and that they will more closely follow the actual melt than has been the case since the first of the year.

Coke

May foundry coke prices are unchanged at \$9 a ton for delivery outside the switching district. April shipments approximate those in March and early releases for May are promising. Coke plants are 7 to 10 days behind on deliveries.

Plates

Railroad equipment requirements and use in structural shops still account for the bulk of plate shipments which at best are sluggish and far below the rate of the other finished steel products. Railroad equipment builders are busy on orders received and prospects for new orders are good. The Grand Trunk plans to repair 600 hoppers and 350 box cars and it may enter the market for 100 automobile and 100 coal cars. Scrap dealers, in negotiating with railroads for cars that are to be wrecked, gather the impression that not less than 10,000 new cars are wanted by Western railroads. About 350 tons of plates will go into a dry dock at South Chicago, Ill.

Wire Products

After experiencing a slight recession in incoming business, wire producers are now reporting a better volume of orders and they are looking forward to an active May.

The duration of the spring business bulge is in doubt, but it has already run past normal expectations and there are some so optimistic as to predict that before operations recede from the present range of 65 to 70 per cent of capacity output will climb higher. This attitude is based in part on Government work which promises to expand. In fact, inquiries from Government channels are already beginning to show marked improvement. The rate question now before Eastern passenger lines is looked upon as a stumbling block in the path of heavier railroad purchases.

Rails

Two Western railroads are starting to negotiate for a total of 10,000 tons of rails. No purchases have swelled order books in the past week, but producers have the impression that secondary buying can be looked for as the year advances. Total purchases of rails in the first four months of 1936 exceed the total for the whole of 1935. Mills are scheduled at 60 per cent of capacity which will be held at least through May. Accessory orders total 1200 tons.

Sheets

Some mills are making headway against deferred shipments and the average of deliveries has dropped from four weeks to a range of from three to four weeks. Automobile manufacturers are placing heavy commitments for May deliveries. There is also new buying by farm implement makers.

Bars

Shipments of this commodity have lost first place to structural shapes though from all indications the change is temporary and was brought about not by a drop in the high rate of movement of bar mill products but by a spurt in demand for the heavier material. Tractor plants figure that there will be at least 60 days more of capacity output. Miscellaneous use is still spreading.

Structural Material

Releases to mills are by far the best of the year and new sales are close to the high for the past four months. This week's business includes more private work, including several small tonnages from the railroads. With the exception of a 1000-ton office building to be constructed at Durham, N. C., practically all new inquiries are for bridges and grade crossings.

Warehouse Business

Due to exceptional demand from the manufacturing trade, April is climbing ahead of March and there are no signs as yet of a leveling

action which is common for the average fourth month. Some warehousemen are drawing a parallel between 1936 and 1924, the latter year having performed as is 1936 up to the end of April. Then, as the presidential election drew near, warehouse demand started to slump and did not revive in any marked degree until after the first week in November. These warehousemen point out that 1924 like 1936 was a year when recovery from business depression was under way.

Cast Iron Pipe

New buying is confined almost wholly to contractors' jobs which were awarded last fall but were held up because of the difficulties of winter construction. Fresh inquiry is sluggish, being confined to scattered and small WPA projects. Shipments remain in good volume.

Reinforcing Bars

A fair amount of new business continues to reach shops which are still well supplied with work and which need not worry about schedules for some weeks to come. In prospect are 1200 tons for the Outer Drive, Chicago; 500 tons for a soap factory, Hammond, Ind.; and, a large amount of State bridge and overhead crossing work. Bids have been rejected on a 200-ton bridge at Joliet, Ill. All phases of this market are showing a degree of stability such as has not been experienced for a number of years.



**... Structural work heavy;
rail order placed.**

o o o

**... April pig iron holding
up to March level.**

ST. LOUIS, April 28.—The Kansas City Southern Railroad has purchased 4,000 tons of rails, 3,000 tons from the Carnegie-Illinois Steel Corp. and 1,000 tons from Inland Steel Co. The Board of Public Service of St. Louis has awarded contracts to Carnegie-Illinois Steel Corp. for 660 tons of 100-lb. rails, 1,000 pairs of angle bars, 27,000 standard tie plates and other accessories, and to the Mississippi Valley Structural Steel Co. 970 tons, for an approach for the Municipal Bridge across the Mississippi River.

The State of Missouri will open bids May 7 for highway projects requiring 1100 tons of structural steel. Illinois Steel Bridge Co. is low bidder on an overpass at Madison, Ill., requiring 1000 tons of structurals.

Business in all lines of finished iron and steel is good, with sea-

sonable items such as roofing and wire products outstanding. Reports of warehouse interests and jobbers indicate that March business was the largest for the month since 1930, and since April 1, there has been a further expansion in new orders placed.

Shipments of pig iron for April will be about equal to March, which is regarded as a healthy condition in view of the fact that much of the tonnage shipped in March was to wind up old contracts at a lower price than prevails now. Reports from the agricultural implement sections of Illinois indicate that there will not be the usual seasonal let-up in operations because of heavy order file. Jobbing foundries are busy with overflow work from the manufacturers' plants.



**... New England activity is
being maintained.**

o o o

**... Pig iron buying contin-
ues light.**

BOSTON, April 28.—April is ending with New England holding its own industrially, but a great deal of uncertainty exists because of European and domestic developments. Consequently little or no effort is made to expand manufacturing or manufacturing facilities.

Saco Lowell Shops have fully recovered from effects of the recent flood and are busy manufacturing a new rayon slasher developed by Manville-Jenckes Corp., engineer.

Pig iron buying is very largely in dribbling lots for immediate delivery. Melters still show little inclination to anticipate requirements. Due to new developments at its Everett, Mass., furnace, the Mystic Iron Works will not blow in May 1, as anticipated. It will be at least May 15 before operations start.

Harwich, Mass., has closed bids on about 1600 tons of cast iron pipe, mostly 10 in., but has made no award as yet. Current buying of pipe is in small lots and without competition, but the aggregate tonnage is fairly satisfactory. Ware-

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between 35 and 45 who is now making and earning at least \$400 a month. To take complete charge of mechanical end of large Middle West sheet metal stamping and fabricating plant. Will pay \$6,000 minimum to start for right man. Wonderful opportunity for hard worker who desires to go places. Replies strictly confidential.

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house shipments are just about holding their own and running slightly ahead of a year ago. Buying of reinforcing steel bars is largely in small lots with prices generally firm.



... *Steel production on Coast is close to capacity.*

o o o

... *Warehouse prices revised.*

SAN FRANCISCO, April 28.—General improvement in business activity on the Coast is reflecting itself in mill operations which, based on ingot production, are averaging over 90 per cent of rated capacity. A greater number of furnaces are in operation than at any time in the last three years. Some mills are believed to be behind on delivery of finished products. All sources, including mining, agriculture, industry and governmental projects, have contributed to the improvement.

Recent revisions in warehouse price schedules have been made. At San Francisco and Los Angeles galvanized sheets are now quoted at 4.50c. and 4.40c. respectively on No. 24 and lighter and 5.00c. and 4.60c. on No. 22 and heavier. An advance of 25c. on plates, shapes and soft bars was recently made at Seattle. Coast jobbers have felt the serious competition of foreign nails which are reported to have been dumped several times recently at \$2.10 a keg, although the quoted importer's price is \$2.45. Domestic common wire nails are now listed at \$2.90, base per keg, in less carloads.

Scrap purchases are active and prices are strong. The Japanese buyer is still an important factor although his purchases have been lighter due to local demand and less favorable water freight rates.

It is reported that the Bureau of Yards & Docks expects to call for bids within the next 90 days for the construction of a \$10,000,000 floating drydock in which 43,120 tons of steel will be involved. The structure will be fab-

ricated on the Pacific Coast and towed to Pearl Harbor, T. H. Early construction of the new post office and court house in Los Angeles is seen in the call for bids for clearing of the site. About 15,000 tons is expected to be involved.

Steel lettings during the past week were featured by the 1200 tons of shapes taken by Consolidated Steel Corp. for Consolidated Aircraft Corp. factory additions

at San Diego. An inquiry for 3000 tons of bars for Fort Peck outlet tunnels topped the new projects listed.

Stockhoff Supply Co., St. Louis, has moved from 107 North Main Street to Twenty-third and Walnut Streets, where it occupies 18,000 sq. ft. of floor space, an increase of approximately 33 per cent over former plant. In addition to heating systems and other equipment handled, company has added a line of sheet metal.

It's the bearing that counts!

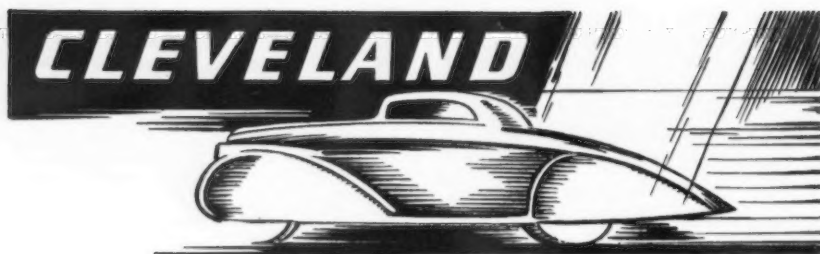
Below: Logan bearings on the job. Molds are forwarded to this pouring station direct from molding machines in another bay, via Logan Rolls. Former practice was to pour molds in same bay as molding machines, which tied up machines on account of crane service. Writes the customer, "We find that the output of these machines has increased about 25% since roller conveyors were installed, and crane delays eliminated."



BEARINGS make the Foundry Roller

● Bearing construction is a paramount factor in any type of roller conveyor. In *foundry conveyors*, bearings assume an added importance. The Logan Dust-Protected Bearing (illustration upper right) is unusually well suited to foundry service. (a) In protected position—set back from end of roll. (b) Revolves as freely as a plain bearing because it has no felt washers. (c) The outer (dust) shield is fixed to the stationary inner race—does not touch any rotating part. (d) Molten metal dropping between shield and frame cannot "freeze" the roll. (e) In a reasonably dry atmosphere, no lubrication required. There is a Logan engineer near you. For further information write LOGAN CO., Inc., 545 Buchanan St., Louisville, Ky.

Logan Conveyors
LOUISVILLE



*... Large freight car inquiries are market feature;
70,000 tons of steel called for.*

□ □ □

... Production declines three points to 76 per cent.

□ □ □

... Steel demand from automotive industry slightly lower.

CLEVELAND, April 28.—A moderate recession in the demand for finished steel is in evidence but this is regarded as only temporary. Decreased activity is due largely to a slackening in business, particularly in sheets and strip steel from the motor car manufacturers who made large-lot purchases earlier in the month. With present heavy automobile production schedules, a new wave of buying by this industry is not expected to be long delayed. Steel bookings by Cleveland sales offices in April will run only a little below those in March.

Ingot output in the Cleveland-Lorain district declined three points to 76 per cent of capacity this week, two local open-hearth furnaces having been taken off. With good backlogs finishing mills continue to operate at near capacity.

Steel inventories in consuming plants are low and purchases are largely for early requirements. Mills are still being crowded for deliveries, particularly on sheets.

The outstanding development this week is the pending purchase of freight cars by the Van Sweringen railroads. The Chesapeake

& Ohio is inquiring for 5400 cars and the Pere Marquette for 500 cars. These, with the 777 cars pending from the Nickel Plate that probably will be placed this week, will require approximately 70,000 tons of steel. In addition, the Wheeling & Lake Erie will build 50 freight cars in its own shops.

No deviations from regular quotations are reported on finished steel products and pressure to secure modification of the new quantity differential schedules has to a considerable extent disappeared. Bolt and nut makers have revised prices on stove bolts in packages, an additional 10-point discount being added. Scrap prices have softened.

Pig Iron

Consumers are following a hand-to-mouth buying policy and sales in small lots for prompt shipment are holding up well. Automobile foundries and the agricultural implement and heating industries continue to take a good deal of iron, the demand from these sources showing no falling off. The jobbing foundry industry is operating irregularly, some plants being very busy and others not very active. Foundries operated by companies making various products generally are quite busy.

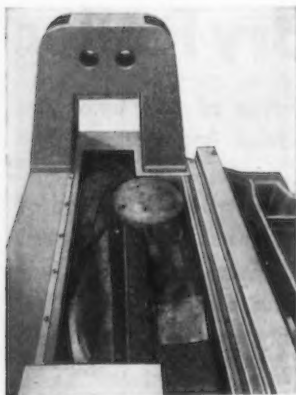
Bars, Plates and Shapes

While some sizable lots of bars for automobile parts were placed by forge shops during the week, the volume of bar business has declined moderately. Some forge shops are now buying in larger lots than heretofore in order to obtain the maximum price reductions. There is a fair amount of activity in the construction field and private work has increased. The Dayton Power & Light Co. has placed 1000 tons for its plant addition and a Cleveland contractor has taken 800 tons for the Corning Glass Co., Corning, N. Y.

Sheets

Business slackened somewhat the past week, owing largely to the absence of round lot orders from the automobile manufacturers who made large purchases earlier in the month. These are crowding mills for shipment and with automobile production still on the uptrend the lull is regarded as only temporary. With deliveries extended some miscellaneous consumers have made larger purchases than customary and new business from these also has subsided. Larger consumers of galvanized sheets are complaining because quantity deductions allowed on hot and cold-rolled sheets are

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not applied to the galvanized product, but as mills allow jobbers a discount they are not disposed to make any concession on quantities to consumers.

Strip Steel

Fresh orders for both hot and cold-rolled strip in good-sized lots were placed during the week by General Motors parts plants, evidently to take care of increased production schedules. New business in hot strip from cold rolling plants is not as heavy as earlier in the month. Miscellaneous demand is only fair. Mills still have good backlogs of orders.

Bolts and Nuts

Prices of stove bolts in package lots have been revised, 10 points having been added to the discount. They are now quoted under two classifications, one with nuts on and the other with nuts separate. An additional five-point discount is allowed when nuts are separate. Stove bolts in bulk are unchanged. Makers also have removed the case lot requirements for application of discounts on all grades of bolts and nuts.

The volume of business is well maintained. Sales and shipments for April are estimated at 10 to 15 per cent higher than in March.

Iron Ore

The bulk freight shipping season opened during the week with the sailing of several boats with cargoes of coal for Lake Michigan ports. They will load with ore at Escanaba for their return trips. Ice conditions in Lake Superior still are bad. It is doubtful if any ore will start down the lakes during April.



Conway, N. H., plans pipe lines for water system; also other waterworks installation. Cost about \$40,000. Financing is being arranged through Federal aid.

Binghamton, N. Y., plans pipe lines for water system, including new main line for trunk service from Susquehanna River source of supply; also new 10,000,000-gal. water storage reservoir, pumping station, filtration plant and other waterworks installation. Cost close to \$900,000. G. A. Giles is city engineer.

Allentown, Pa., plans 6-in. pipe for extensions and improvements in water system in several streets; also two large reservoirs, with connecting pipe lines to present main trunk system. Morris Knowles, Inc., Westinghouse Building, Pittsburgh, is consulting engineer for last noted project.

Dickson, Tenn., closes bids May 7 for pipe for water system and other waterworks installation. Freeland, Roberts & Co., Nashville, Tenn., are consulting engineers.

Hemp, N. C., asks bids until May 6 for pipe for water system; also for 200,000-gal. elevated steel tank and tower, pumping machinery and auxiliary equipment, filtration equipment, etc. L. V. Edwards, Hemp, is engineer.

Hancock, Mich., plans pipe line for new soft water supply from properties of Copper Range Mining Co. Financing has been arranged through Federal aid. William J. Hoffenbacher is city clerk.

Hillsboro, N. D., plans 6-in. pipe for replacing present 4-in. water lines. Cost about \$30,000. Financing is being arranged through Federal aid. E. L. Lium, City Hall, Grand Forks, N. D., is consulting engineer.

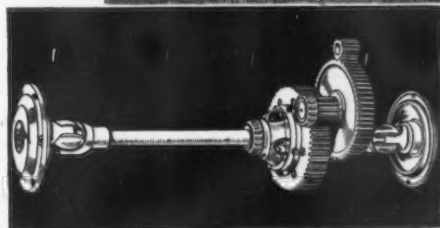
Oshkosh, Wis., asks bids until May 6 for pipe, valves, fittings, etc., for water system. F. M. Wolverton is city engineer.

Indianola, Miss., closes bids May 11 for galvanized pipe for water system; also for couplings, fittings, etc. George M. Keys is town clerk.

Bentonville, Ark., will take bids soon for pipe for extensions and improvements in water system, including replacements; also for other waterworks installation. Cost about \$45,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

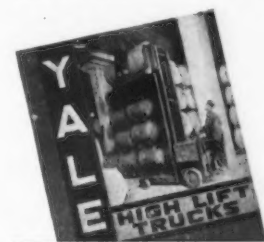
Seattle, has placed 225 tons of 4 to 8-in. with United States Pipe & Foundry Co.

Pittsburg, Cal., plans 15-mile main water line from new reservoir on Kellogg Creek to city limits; also extensions and improvements in distribution lines. Entire project will cost about \$1,750,000. A. Kempkey, Hobart Building, San Francisco, is consulting engineer.



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... Activity of railroads and construction industry dominates metropolitan area.

o o o

... Bridges over East River and Narrows are contemplated.

o o o

... Demand for lighter forms of steel begins to pick up.

NEW YORK, April 28.—Demand for heavy steel products this month has been considerably ahead of March. The opposite has been true in the case of sheets, strip steel and wire products, although orders for tin plate have improved seasonably. A number of sellers also report an expanding demand for sheets and strip during the last week, indicating that stocks accumulated at the end of the first quarter are being used up rapidly.

The railroad picture continues to brighten. Eastern car builders are figuring on the inquiry of the Chesapeake & Ohio for 5400 freight cars, which is one of the largest to come out in the last four years. The Nickel Plate is expected to take action this week on 775 freight cars and the Pere Marquette is inquiring for 500 automobile cars.

The Lehigh Valley has bought steel for the repair of 2000 additional freight cars, which will practically complete its rehabilitation program. The New Haven will make repairs and alterations to 2500 coal cars. The New York Central is said to be contemplating the purchase of motive power.

The erection of a suspension bridge over the Narrows, connecting Brooklyn and Staten Island is again being considered, and Federal assistance will be sought. The building of a bridge instead of a tunnel to connect Manhattan and Queens at Thirty-eighth Street, Manhattan, is also being considered. A bridge would require considerably more rolled steel than a tunnel.

Bids are soon expected to be

asked on a toll bridge at Far Rockaway, N. Y., requiring 12,000 tons of structural steel. The Marine Parkway job in Brooklyn will be out for bids about May 15. The superstructure of a bridge at Port Arthur, Tex., on which New York contractors are figuring, will require 10,000 tons of steel.

Warehouse demand for standard pipe is improving and oil companies are buying tubular goods more freely than has been the case for four or five years. A number



... Awards of 2850 tons —10,900 tons in new projects.

AWARDS

Hartford, Conn., 200 tons, manufacturing plant unit, to Concrete Steel Co.

Scranton, Pa., 1300 tons, junior high school, to Bethlehem Steel Co.

Chicago, 350 tons, Kellogg Spencer Co., to Concrete Engineering Co.

State of Wisconsin, 200 tons, road work, to Concrete Engineering Co.

State of Illinois, 100 tons, road work, to Concrete Steel Co.

Fresno, Cal., 100 tons, school administration building, to Kyle & Co.

Long Beach, Cal., 100 tons, Veterans' Memorial building, to Soule Steel Co.

Reno, Nev., 100 tons, State underpass, to an unnamed bidder.

of large tank projects are also before the trade.

Pig Iron

Sustained volume of shipments would indicate that the melt is holding its own in this district, although current scarcity of orders affects producers and agents unfavorably. Announcement has been made that Troy, N. Y., stack will go into blast May 1, as scheduled. Mystic furnace at Everett, Mass., has deferred its opening date until about May 15. Forecasts of more active buying conditions ahead are based on a sustained rate of melt, entailing a steady depletion in consumer stocks over and above current replacements purchases. Just at present, however, political factors in an unsettled election year appear to be coloring the market picture, and a conservative view forbids too much optimism.

Reinforcing Steel

Slightly more activity was in evidence in the reinforcing bar market this week, but conditions are still quite slow. Several large jobs are pending, but have not yet been definitely announced. Most of the work being let for the past two or three weeks has been in the form of accumulations of small lots of less than 100 tons. Although business is dull, the base price of 2.40c. has still not yet received sufficient test to comment on its stability. Thus far, price conditions have been only fair.

Wilmington, Cal., 125 tons, wharf and transit shed at berth No. 155, to an unnamed bidder.

Multnomah County, Ore., 100 tons, highway work for Bureau of Public Roads, to an unnamed bidder.

State of Oregon, 165 tons, bridge and highway work in four counties, to unnamed bidders.

NEW REINFORCING BAR PROJECTS

Syracuse, N. Y., 100 tons, steel joists for new medical arts building at Syracuse University.

Philadelphia, 1700 tons, vocational school at Ninth and Mifflin Streets; McCloskey & Co. low bidder but exceeded appropriation; job may be rebid.

Philadelphia, 1700 tons, vocational school at Twenty-second and Lehigh Avenue; bids will be asked soon.

Washington, 6000 tons, building for Bureau of Printing and Engraving; John McShain low bidder on general contract.

State of Illinois, 1000 tons, road work.

Joliet, Ill., 200 tons, bridge; bids rejected.

Hammond, Ind., 500 tons, Lever Brothers soap plant.

State of Wisconsin, 450 tons, three bridges; bids May 8.

San Francisco, 132 tons, city viaduct at Harrison and Beale Streets; bids May 6.

Fullerton, Cal., 200 tons, school; bids opened.

Santa Ana, Cal., 100 tons, high school addition; bids opened.

Los Angeles, 125 tons, addition to North Hollywood high school; bids opened.

Los Angeles, 250 tons, two buildings at Virgil junior high school; bids opened.

King County, Wash., 132 tons, State undercrossing at Black River Junction; general contract awarded.

PIPE LINES

Old Dutch Refining Co., Muskegon, Mich., John Borden, president, is interested in project with group of oil operators to build welded steel pipe line from point about 90 miles south of Cincinnati to Muskegon and vicinity, for crude oil transmission from Louisiana and east Texas oil field districts to oil refineries in Michigan area noted. From pipe line terminus mentioned, an oil barge line system will be established for transporting crude oil from producing areas, and fleet of steel barge-tankers will be built for this service. Proposed pipe line will be about 350 miles long, with branches to different distributing points, and will include pumping stations at points along route for booster service. Project is being developed owing to inability to secure sufficient supply of crude oil from existing Michigan fields. Cost about \$6,000,000.

Chemical Warfare Service, Edgewood Arsenal, Md., closes bids May 18 for 2000 ft. of 3/4-in. and 2000 ft. of 3-in. black wrought steel pipe (Circular 82).

Federal Procurement Office, Montgomery, Ala., acting for Birmingham and WPA, Fifth District, Montgomery, has low joint bid from Ingersoll Iron Works Co., Birmingham, and Chicago Bridge & Iron Works, Chicago, at \$1,236,843 for about 100,000 ft. of 48, 54 and 60-in. welded steel pipe for new industrial water system at Birmingham. Entire project will cost close to \$6,000,000. Sanborn & Bogert, 30 Church Street, New York, are consulting engineers.

Southern States Refining Co., Thirteenth Street and Twenty-fifth Avenue, Gulfport, Miss., plans welded steel pipe line from municipal waterfront property to new local oil refinery for crude oil transmission. Cost over \$50,000.

Manufacturers Light & Heat Co., Union Trust Building, Pittsburgh, plans new welded steel pipe line from point near Berlin, Pa., to Somerset, Pa., about nine miles, for natural gas transmission. Company is closing negotiations for purchase of properties of Somerset Home Gas Co., properties of Somerset Home Gas Co., Somerset, and will operate in future. Extensions and improvements will be made in distributing lines.

Quartermaster, Army and Navy General Hospital, Hot Springs, Ark., asks bids until May 20 for about 12,000 ft. of galvanized steel and wrought iron pipe; also for expansion joints, gate valves, fittings, etc. (Circular 11).

Salem, Ore., has authorized plans and surveys for new 30 and 36-in. steel pipe line for gravity water supply from North Santiam River to city limits, about 17 1/2 miles; also for 150,000-gal. elevated steel water tank and tower and 10,000,000-gal. water filtration plant. Bids are scheduled to be asked during summer and work started early in fall. Stevens & Koon, Spalding Building, Portland, are consulting engineers. Cuyler Van Patten is manager of water department.

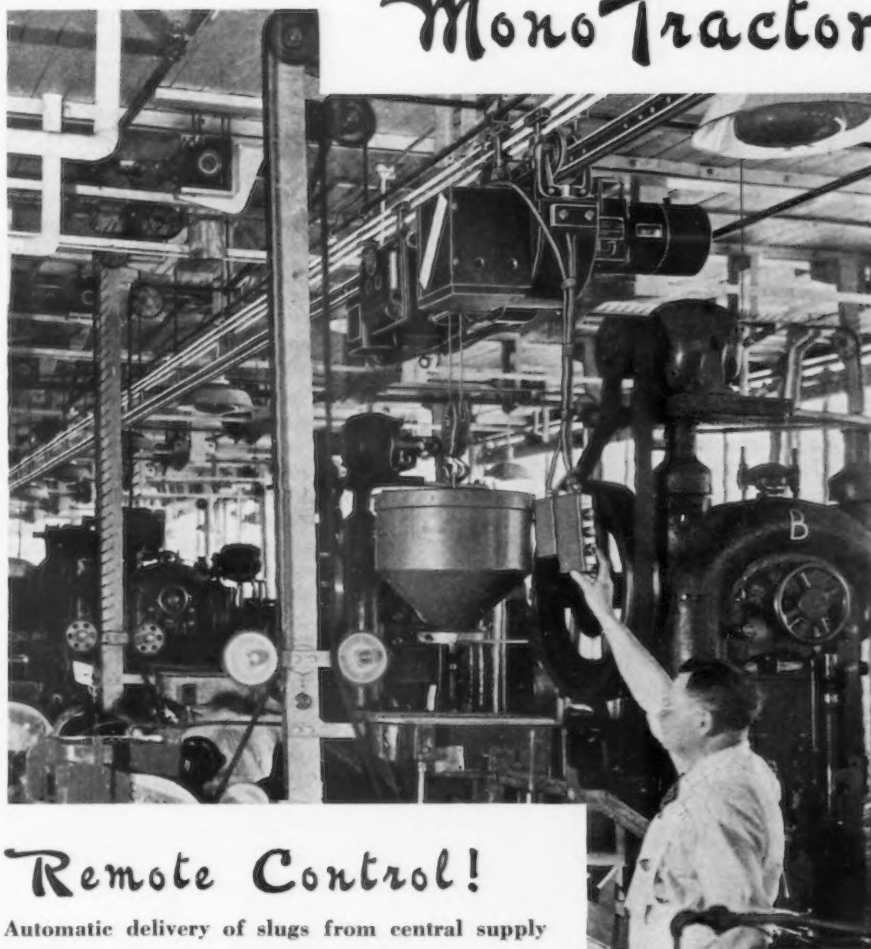
Steel Corporation Increases First Quarter Earnings by 42 Per Cent

OPERATING income of the United States Steel Corp. and subsidiaries during the quarter ended March 31, amounted to \$17,664,596 after deducting all expenses, including ordinary repairs and maintenance, estimated state, local and Federal taxes and contingency reserves. From this figure \$12,489,576 was laid aside

for depletion, depreciation and obsolescence. Addition of sundry net profit to the balance left a net of \$5,199,020. Proportion of overhead expenses charged separately to account of the Lake Superior Iron Ore Properties and Great Lakes transportation service totaled \$600,000, leaving net income before interest of \$4,599,020. After interest

American

MonoTractor



Remote Control!

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charges, a net income available for dividends of \$3,376,304 remained.

Directors of the Corporation declared a 50c. dividend payable May 29 to preferred stockholders of record May 4. The remaining \$1,574,899 was transferred to surplus.

The earnings in amount of \$17,664,596 compare with \$12,428,499 earned in the first quarter of 1935. This represents an increase of \$5,236,147, or 42.1 per cent. Net income for the quarter of \$3,376,304 compares with a deficit of \$2,173,801 incurred in the comparable period a year ago. This was a figurative increase of \$5,550,105.

The number of employees working during the quarter was 198,269, as against 189,267 in the same period a year ago.

Volume of finished steel shipped

during the quarter totaled 2,181,281 tons. In a statement submitted by Myron C. Taylor, chairman, operations, as measured by finished steel output, were declared to have averaged 47 per cent of capacity during the quarter, the highest for and three-month period since that ending March 31, 1931.

"Bookings during the first quarter exceeded the tonnages in the first quarter of 1935 by 25 per cent. Prices received on shipments made averaged about the same as in the fourth quarter last year but somewhat below prices realized in the first quarter of 1935.

Jones & Laughlin Steel Loss Is Heavier

Jones & Laughlin Steel Corp. and subsidiary companies, in the

first quarter of 1936, sustained a net loss of \$933,279, after deductions for depreciation, depletion, taxes and bond interest. This compares with a net loss of \$794,789 in the same period last year.

Republic Profits Drop

The Republic Steel Corp. and subsidiaries earned \$361,031 during the first quarter, as compared with \$1,191,440 in the preceding three months and with \$1,834,235 in the first quarter of last year.

The decline in earnings reflected lower prices for steel prevailing during the quarter and the reduced operating rate in January and February that resulted from extremely cold weather and curtailment of automobile production.

Fourth Patenting Unit Installed at Bethlehem's Maryland Plant

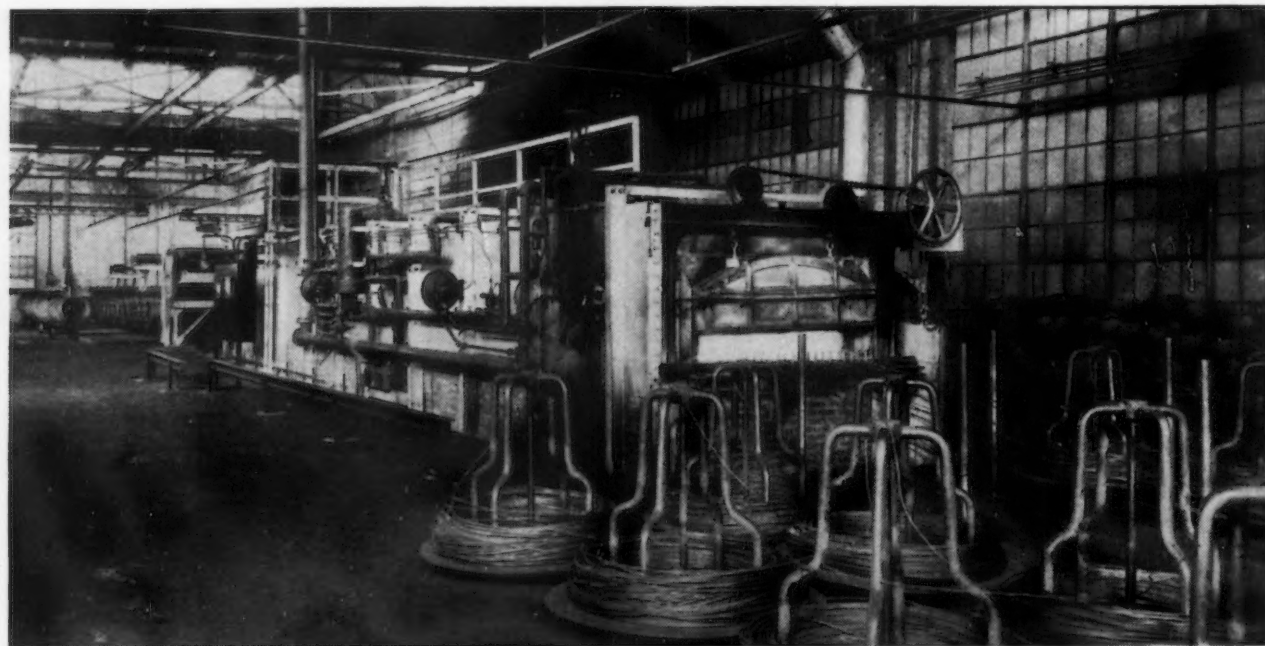
A NEW patenting unit, the extent of which is shown by the accompanying illustration, was recently placed in service by Bethlehem Steel Co., Bethlehem, Pa., in the wire-making division of its Maryland Plant, Sparrows Point, Md. Designed for and engaged in the manufacture of high-carbon wire, this unit is the fourth to be placed in continuous operation at this plant since 1930. The addition of this fourth unit provides for a monthly capacity of from 3000 to 4000 tons of patented high-carbon spring rods and wire at this plant.

These four units are housed in a building 600 by 75 ft. adjoining the main wire drawing room. Ample space is provided between the furnaces and take-up frames to permit the proper handling of the wire. Each unit is equipped with a 500-lb. capacity hoist.

All furnaces are of the semi-muffle type, top fired with oil and provided with automatic temperature regulation. The heating of the stock is accomplished by the use of radiant heat, so that the flame is prevented from coming into direct contact with the steel being treated.

Each furnace takes 36 wires and the take-up frames are powered with variable speed motors.

This patenting installation is so flexible that any individual grade of stock can be given the proper preparatory heat treatment best adapted for its individual application. The types of patenting available cover the complete range from air patenting to special lead patenting for all of the quality classifications of high-carbon wire, which have been developed for industrial applications.



GENERAL view of new patenting unit installed by Bethlehem at its Maryland Plant for the production of patented high-carbon rods and wire.

PHILADELPHIA



... District rate holds at 45 per cent.

o o o

... Consumers purchase sparingly.

o o o

... N. & W. and B. & O. railroads distribute orders.

PHILADELPHIA, April 28.—All district mills have practically cleaned up the low-priced business taken late in the first quarter. A little of this tonnage remains to be shipped, but is of special type or treatment which crowded mills found practically impossible to get out on time. Rolling schedules now include only those tonnages taken recently or in March for definite second quarter delivery.

New business is not developing as fast as was expected, but the past week has seen a decided improvement over the first half of the month. According to sellers, there is little resentment against new extra lists. There is, however, considerable consumer sentiment to the effect that mills should interpret delivery clauses liberally. That is, even though \$3 a ton is allowed for 150 tons or more sheets shipped at one time, purchasers of this amount insist that one time should be construed as one week or, in some cases, two weeks. Many sellers consider this attitude justifiable.

Slight changes in district open-hearth activity failed to alter the eastern Pennsylvania operating rate, which remains at 45 per cent of capacity. One good feature of current activity is that rolling mills are keeping pace with furnace output, i.e., no ingots are being stocked. Central Iron & Steel Co. and some of the Bethlehem plants continue to work practically at capacity, Phoenix has added a third unit to take the place of one approaching the end of its campaign, and all other district mills are unchanged from last week. The present rate of 45 per cent compares with 32 per cent a year ago.

Norfolk & Western Railroad last week awarded about 700 tons of fabricated high-tensile steel car parts to Ralston Steel Car Co. and Virginia Bridge Co., and nearly 800 tons of fabricated carbon steel (hoppers, etc.) car parts to By-Products Steel Co. and Virginia Bridge Co. Also, about 2000 tons of carbon steel beams, Z's, angles, etc., was let to the Steel corporation and Bethlehem, with the former securing much the greater proportion. The Baltimore & Ohio has purchased about 2000 tons of tie plates, spikes, etc., from Jones & Laughlin, Bethlehem and the Steel corporation.

Pig Iron

District consumption continues on a high level. Day-to-day orders are in fair volume, and several large melters have committed themselves for sizable amounts. There are indications that foundries are liquidating yard stocks at a fair pace, and sellers of iron anticipate a gradual increase in bookings until weekly sales volume approximates consumption.

Sheets and Strip

The market has thrown off its lethargy to a certain extent. Most small jobbers are still not interested in new orders, but two of the larger firms have come into the market for attractive lots at new price levels. It is reported that Virginia will soon ask for tenders on 200 to 300 tons of license plate stock. Local autobody stamping plants continue to work at almost peak schedule, and, accordingly, are buying steel in fair quantities. For the most part, however, mis-

cellaneous outlets continue the major support of this market.

Bars, Plates and Shapes

The demand for construction steel has improved slightly, but activity is considerably under what is normally expected for this time of the year. Fabricators are holding prices moderately firm, and no weakness in reinforcing steel transactions is discernible. Awards of fabricated shapes during the week amounted to only 350 tons, but the

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volume of pending tonnages has improved. McCloskey & Co. are low bidders on a vocational school here which will take 5300 tons of shapes and 1700 tons of bars. The low bid, however, exceeds the appropriation by about \$400,000, and new tenders may be asked for. A second vocational school of this same type is expected to come out soon. A sizable job is pending at Baltimore, and several additional State bridges have come out. A Government building at Washington, on which John McShain is low bidder, will require 6000 tons of bars. Bethlehem Steel Corp. has been awarded 1300 tons of bars for a high school at Scranton, Pa.

Imports

The following iron and steel imports were received here last week: 332 tons of chrome ore from British South Africa; 176 tons of pig iron from British India; 50 tons of ferromanganese from Poland, and 37 tons of steel tubes, 12 tons of steel billets, 6 tons of C D S wire, 3 tons of steel forgings and 3 tons of steel bars from Sweden.



... Steel ingot production again increases

o o o

... Sheet rolling at high rate.

BUFFALO, April 28.—Buffalo steel mill operations are ahead of last week, with Bethlehem's Lackawanna plant operating 20 open-hearth furnaces; Republic Steel Corp., five, and Wickwire-Spencer, one. Seneca sheet division of Bethlehem is running at a slightly faster pace, being at close to 90 per cent of capacity operation.

A milling company addition job provided a 100-ton structural contract for a local fabricator but no new sizable structural lettings or projects have come out this week so far. The Syracuse medical center will require, in addition to the structural shapes reported last week, probably 100 tons of steel joists. There is a steady run of smaller jobs, including roads and lesser building projects, which is combining to keep the reinforcing bar makers busy.



... Ingot output curtailed for slight repairs.

o o o

... Finishing mills at close to capacity.

CINCINNATI, April 28.—While repairs in one unit of the leading interest tended to curtail finished steel production last week, bookings were at an average of 90 per cent of capacity. Steel purchases tend upward as consumers indicate a more rapid exhaustion of inventories than anticipated.

New business is sufficiently heavy to warrant an advance in rolling schedules this week, to near capacity. Automobile, stove and refrigerator manufacturers are leading in current demand. Prices are steady and no deviation is reported.

Shipments of foundry grades of coke have increased slightly as foundries swung into heavier operations.

The pig iron market shows little change. Melters are in the market for spot shipments covering gaps in inventories, but heavy contracting is absent. Weekly average sales are unchanged at the 1200-ton level. Machine tool and stove foundries have increased their melts so that averages are now close to 66 per cent of capacity.



... Southern rail well booked through June.

o o o

... Demand for heavy steel products increasing.

BIRMINGHAM, April 28.—Nashville, Chattanooga & St. Louis has bought 3,425 tons of rail and 500 tons of track accessories from the Tennessee Coal, Iron & Rail-

road Co. It now seems likely that the rail mill will continue in operation until some time in June.

A recent gradual upward trend in demand for plates, structural shapes and bars has appeared to offset the decline in sheets and wire products, which had come from dealers and jobbers during the last quarter.

Pig iron buying is light at this time, also due to heavy deliveries in February and March. Most foundries are well stocked for the present. A resumption of purchases on a more extended scale is looked for next month.

Pressure pipe shipments this month will be from 10 to 15 per cent ahead of last month, the gain coming from releases of old orders. These releases have been increasing at a fair rate. Current bookings of new business follow close to the same rate of March.

Furnace operations remain steady, with 12 blast and 15 open-hearth units in operation.



Chesapeake & Ohio is inquiring for 3500 hopper cars, 500 coal gondolas, 250 low side gondolas, 1000 box cars and 150 automobile cars.

Western Fruit Express is inquiring for 50 steel underframes.

Grand Trunk Western will rebuild 600 hopper bottom coal cars and 300 box cars in own shops. A number of coaches, parlor and dining cars are being air conditioned. This road also plans to buy 100 50-ft. automobile box cars and 100 50-ft. gondola cars.

Pere Marquette has asked for bids on 500 automobile cars.

American Car & Foundry Motors Co. has received following orders for motor coaches: Omnibus Finance Corp. for Newport News, Va., three; Norfolk-Southern, one; Warwick Coach Lines, one; Schenectady Railways, one; Blue Way Lines, Inc., two, and Boston Elevated Railway, five.

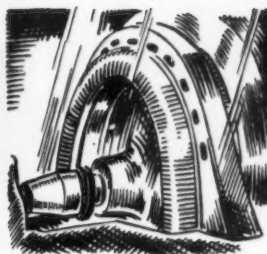
RAILS AND TRACK SUPPLIES

Nashville, Chattanooga & St. Louis has placed 3425 tons of rails and approximately 500 tons of track accessories with Tennessee Coal, Iron & Railroad Co.

Gulf, Mobile & Northern has ordered 1437 tons from Tennessee Coal, Iron & Railroad Co.

Grand Trunk Western plans to lay 8000 tons on main line between Chicago and Port Huron.

Kansas City Southern has purchased 3000 tons of rails from Carnegie-Illinois Steel Corp. and 1000 tons from Inland Steel Co.



NON-FERROUS

... **Stock market weakness affects some non-ferrous metals.**

... **Export copper less active—tin inquiry dries up.**

... **Lead stocks increase 1600 tons in March.**

NEW YORK, April 28.—Non-ferrous metals reacted mildly to unfavorable news from the stock market last week. In copper, export business softened somewhat. Domestic sales remained quiet, but were said not to have been affected by security dealings. Orders on Friday and Saturday aggregated 1340 tons, and the running total for the month rose to 156,262 tons. Yesterday's sales are believed to have fallen under 500 tons. Despite the appearance recently of small lots of second-hand metal at a concession, the primary market is firm at 9.50c. a lb. for Connecticut Valley delivery. Resale copper dealt in last week involved too negligible a quantity to produce an impression. While weakness in stocks softened the demand for export material, prices secured on this business held up rather well. Today's foreign quotation for electrolytic is about 9.20c. a lb., usual European base ports, although a range of prices is being quoted.

March statistics released by the Copper Institute were fair. Domestic production of refined copper totalled 67,044 tons, an increase of 12,593 tons over February. Shipments rose 5031 tons to 56,448 tons. Refined stocks in this country advanced by 8309 tons to 238,601 tons at the month's close, while foreign stocks fell 6363 tons to 244,695 tons.

Lead

Demand for lead turned more brisk toward the latter part of the week, and on Friday the leading producer announced its withdrawal from the open market. Officials of the company stated that sales were exceeding allotted intake. Volume of orders in other directions expanded, but was aided partly by diverted inquiry. A rounded view of the market would

indicate that forward needs are now being more generously covered. May is perhaps 40 per cent sold, and some June metal has been taken. Inquiry for April shipment materialized into a little

business on the part of one producer last week. Interested observers point to an upward trend in consumption, with pigment and battery interests and sheet lead and pipe makers outstanding. No change has occurred in the price for lead, which is firm at 4.45c. a lb., St. Louis.

Encouragement was seen in March statistics. Domestic refined shipments totalled 36,743 tons, or 3657 tons above the February figure. Production, at 35,150 tons, indicated an increase of 1023 tons. Stocks fell 1622 tons to 223,388 tons at the month's close.

Zinc

Although featureless as regards selling conditions, the domestic zinc market continues to improve its technical position. Last week's shipments of 3903 tons resulted in unfilled orders registering a decline of 2834 tons, as new orders came to but 1069 tons. At the week's close unfilled orders accordingly stood at 35,743 tons, the lowest they have been since last

The Week's Prices. Cents Per Pound for Early Delivery

	April 22	April 23	April 24	April 25	April 27	April 28
Electrolytic copper, Conn.*	9.50	9.50	9.50	9.50	9.50	9.50
Lake copper, N. Y.	9.62½	9.62½	9.62½	9.62½	9.62½	9.62½
Straits tin, Spot, New York	46.75	46.62½	46.60		46.70	46.80
Zinc, East St. Louis	4.90	4.90	4.90	4.90	4.90	4.90
Zinc, New York†	5.27½	5.27½	5.27½	5.27½	5.27½	5.27½
Lead, St. Louis	4.45	4.45	4.45	4.45	4.45	4.45
Lead, New York	4.60	4.60	4.60	4.60	4.60	4.60

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.

†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-21.00c. a lb., delivered.

Aluminum, No. 12 remelt, No. 2 standard, in carloads, 17.00c. lb., delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.

Antimony, Asiatic, 13.50c. a lb., New York.

Quicksilver, \$77.00 to \$78.00 per flask.

Brass ingots, commercial 85-5-5-5, 9.25c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	48.25c. to 49.25c.
Tin, bar	50.25c. to 51.25c.
Copper, Lake	10.25c. to 11.25c.
Copper, electrolytic	10.25c. to 11.25c.
Copper, castings	10.00c. to 11.00c.

*Copper sheets, hot-rolled	16.75c.
*High brass sheets	14.87½c.
*Seamless brass tubes	17.37½c.
*Seamless copper tubes	17.50c.
*Brass rods	13.12½c.

Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.

Lead, American pig	5.10c. to 6.10c.
Lead, bar	6.10c. to 7.10c.

Lead, Sheets, cut	8.25c.
Antimony, Asiatic	14.00c. to 15.00c.

Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.

Solder, ½ and ⅓	29.50c. to 30.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.	
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From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	51.00c.
Tin, bar	53.00c.

Copper, Lake	10.25c. to 10.50c.
Copper, electrolytic	10.25c. to 10.50c.
Copper, castings	10.00c. to 10.25c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig	5.20c. to 6.50c.
Lead, bar	8.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	19.00c.
Babbitt metal, high grade	55.00c.
Solder, ½ and ⅓	27.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.37½c.	8.12½c.
Copper, hvy. and wire	7.25c.	7.75c.
Copper, light and bottoms	6.25c.	6.75c.
Brass, heavy	4.12½c.	4.75c.
Brass, light	3.37½c.	4.12½c.
Hvy. machine composition	6.12½c.	6.62½c.
No. 1 yel. brass turnings	5.12½c.	5.62½c.
No. 1 red brass or compos. turnings	5.75c.	6.25c.
Lead, heavy	3.62½c.	4.00c.
Sheet aluminum	13.25c.	14.75c.
Zinc	2.50c.	2.87½c.
Cast aluminum	12.12½c.	13.25c.

September. Producers are of the opinion that undelivered sales won't likely recede beneath 30,000 tons without stimulating a new buying wave. In the experience of the period just completed, it was felt that the security market tended to restrain purchases. In the Tri-State area ore output showed effects of the 20 per cent restriction scheme, but production did not recede as much as was contemplated. Prices are unchanged at \$31 and \$32 a ton, depending on the grade. Refined metal continues to sell firmly at 4.90c., East St. Louis basis.

Tin

Dullness in the tin market was not aided by stock recessions on the Exchange, which had the effect of drying up any latent demand. Importers and dealers sold occasional parcels only. Prices, however, remained undisturbed by external conditions and moved within a narrow range. Today's New York quotation on spot Straits metal is 46.80c. a lb. The morning's quotation on standard tin in London was £207 for spot, and £202 15s for futures. The Eastern price was £208 7s 6d. Domestic tin plate interests are operating at a high rate, but have not been in the market for new supplies lately. The feeling is that most producers are pretty well stocked against current needs.

Younstown to Increase Tin Plate Capacity

THE Youngstown Sheet & Tube Co. will increase the tin mill capacity at its Indiana Harbor, Ind., works, for which an expenditure of about \$1,300,000 has been authorized.

The company will also install a new turbine at its Campbell, Ohio, plant to provide additional electrical power and to supply low-pressure steam.

J. C. Argetsinger, general counsel and secretary, Youngstown Sheet & Tube Co., was elected a vice-president at a directors' meeting April 28. Other officers were re-elected except W. C. Reilly, vice-president, who recently announced his retirement.

A. M. LONG, assistant manager of sales at Chicago for the Youngstown Sheet & Tube Co., has been transferred to the company's office at Youngstown, where his title will be assistant manager of sales. Mr. Long was in the Chicago office for about seven years.



... Awards are lower at 14,125 tons as against 20,000 tons last week.

o o o

... New projects of 41,800 tons are the highest since last October and compare with 28,045 tons in the previous week.

o o o

... Plate lettings total 8675 tons.

NORTH ATLANTIC STATES

Fairmont, Vt., 130 tons, State highway bridge, to American Bridge Co.

Seymour, Conn., 400 tons, State highway bridge, to Phoenix Bridge Co.

Hopewell Junction, N. Y., 140 tons, grade crossing elimination, to Phoenix Bridge Works.

Tuckahoe, N. Y., 140 tons, Eastchester high school, to Weatherly Steel Co.

Mount Vernon, N. Y., 300 tons, Nathan Hale grade school, to Belmont Iron Works.

New York, 365 tons, La Salle Academy, to Dreier Iron Works.

New York, 1240 tons, West Bedford Park Boulevard, Bronx, to Shoemaker Bridge Co.

Corning, N. Y., 800 tons, building for Corning Glass Co., to H. K. Ferguson Co.

Philadelphia, 110 tons, theater, Frankford Avenue, to Max Corchin, Inc.

Wilmerding, Pa., 205 tons, school, to Ingalls Iron Works.

Lawrence County, Pa., 895 tons, highway bridge, to Fort Pitt Bridge Works Co.

Cresson, Pa., 280 tons, highway bridge, to Phoenix Bridge Co.

Pennsylvania Railroad, 130 tons, superstructure for bridge, to Phoenix Iron Works.

Tuckahoe, N. J., 120 tons, highway bridge, to Phoenix Bridge Co.

Newark, Del., 110 tons, chemistry building, to Bethlehem Steel Co.

THE SOUTH

Caldwell Parish, La., 180 tons, bridge, to Pittsburgh-Des Moines Steel Co.

CENTRAL STATES

Dayton, Ohio, 1000 tons, addition for Dayton Power & Light Co., to Fort Pitt Bridge Works Co.

Coshocton, Ohio, 130 tons, manufacturing plant, to Ingalls Iron Works Co.

Lorain County, Ohio, 1210 tons, highway bridge, to Mount Vernon Bridge Co.

South Chicago, 430 tons, mold building and runway for Wisconsin Steel Co., to Worden-Allen Co.

South Chicago, Ill., 350 tons, dry dock, to Manitowoc Shipbuilding Co.

Chicago, 200 tons, International Harvester Co., to Gage Structural Steel Co.

Chicago, 140 tons, building in clearing industrial district, to Joseph T. Ryerson & Son, Inc.

Bureau County, Ill., 176 tons, highway work, to Illinois Steel Bridge Co.

Peoria, Ill., 495 tons, highway work, to Vincennes Bridge Co.

Evanston, Ill., 100 tons, building for Marshall Field Estates, to Wendnagel & Co.

Polk County, Iowa, 525 tons, bridge, to Des Moines Steel Co.

Clarinda, Iowa, 300 tons, bridge, to Paxton & Vierling Iron Works.

Wyocena, Wis., 250 tons, hospital, to Wausau Iron Works.

State of Wisconsin, 275 tons, two bridges, to Vierling Steel Works.

Winnebago County, Wis., 165 tons, belt line overhead, to Milwaukee Bridge Co.

St. Paul, Minn., 360 tons, State highway bridge, to Bethlehem Steel Co.

Chicago Great Western Railroad, 100 tons, beam spans, to American Bridge Co.

WESTERN STATES

Denver & Rio Grande Western, 195 tons, three bridges in Colorado, to Milwaukee Bridge Co.

State of Wyoming, 450 tons, bridges, to Midwest Steel & Iron Works.

Whitefish, Mont., 219 tons, State viaduct, to Clinton Bridge Works.

Los Angeles, 100 tons, siphon covers for Metropolitan Water District, to Bethlehem Steel Co.

Wilmington, Cal., 550 tons, transit shed at berth No. 155, to Minneapolis-Moline Power Implement Co.

Seattle, 100 tons, plant for Pennsylvania Salt Mfg. Co., to Pacific Car & Foundry Co.

San Francisco, 150 tons, hopper dredge for United States Engineers, to an unnamed bidder.

CANADA

Leamington, Ont., 610 tons, factory building for H. J. Heinz Co., to Hamilton Bridge Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 710 tons, alterations to brew house, Rupert Brewing Co.

Brooklyn, 2100 tons, Kings County nurses' home and training school.

Far Rockaway, N. Y., 12,000 tons, toll bridge.

Genesee County, N. Y., 390 tons, highway bridge; bids May 5.

Buffalo, 100 tons, addition to Perrot Milling Co. plant.

Philadelphia, 5300 tons, vocational school at Ninth and Mifflin Streets; McCloskey & Co., low bidder, but \$400,000 over appropriation; job may be rebid.

Philadelphia, 5300 tons, vocational school at Twenty-second Street and Lehigh Avenue; bids soon.

Erie, Pa., 125 tons, recreation building for St. Mary's Church.

Wilmington, Del., 150 tons, Friends' school; bids in.

Newark, Del., 300 tons, bridge; bids May 12.

Baltimore, 450 tons, Federal Land Bank building; tenders April 30.

Washington, 260 tons, garage for Sanitary Grocery Co.

SOUTH AND SOUTHWEST

Durham, N. C., 1000 tons, bridge.

Altus, Okla., 675 tons, bridge.

State of Texas, 550 tons, bridges.

Port Arthur, Tex., 10,000 tons, bridge.

CENTRAL STATES

Bedford, Ohio, 750 tons, grade crossing elimination; McHugh Co., contractor.

Mansfield, Ohio, 2800 tons, warehouse and office building for Westinghouse Electric & Mfg. Co.

State of Michigan, 600 tons, grade separations.

Saginaw, Mich., 350 tons, addition to post office.

Pontiac, Mich., 250 tons, store building for S. S. Kresge Co.

State of Illinois, 1900 tons, four highway bridges.

Chicago, 15,000 tons, outer drive bridge; bids May 5.

Chicago, 2800 tons, Randolph Street viaduct; Joseph T. Ryerson & Son, Inc., low bidder.

Watertown, Wis., 100 tons, hospital.

State of Wisconsin, 325 tons, three bridges; bids May 8.

Madison, Ill., 1000 tons, overpass; Illinois Steel Bridge Co., low bidder.

State of Missouri, 1100 tons, highway bridges; bids May 7.

WESTERN STATES

Northern Pacific Railroad, 100 tons, bridge in Montana.

San Diego County, Cal., 620 tons, highway bridge over Santa Margarita River.

Hawaii, 3000 tons, Army airplane hangars; bids in.

FABRICATED PLATES

AWARDS

Middletown, Conn., 1200 tons, caissons, Connecticut River bridge, to Jones & Laughlin Steel Corp.

Fort Peck, Mont., 7475 tons, linings for tunnel No. 1; to Chicago Bridge & Iron Works.

NEW PROJECTS

Denver, 250 tons, outlet pipe for Moon Lake and Taylor Park dams; bids opened.

SHEET PILING

NEW PROJECTS

Los Angeles, 125 tons, for Treasury Department, Proposal No. 616; bids May 1.

Secretary Roper Offers Administration's Program for Industrial Reemployment

WASHINGTON, April 28.—Reported to have been read at the White House before its delivery, the address of Secretary of Commerce Daniel C. Roper before the Chamber of Commerce of the United States today, told American industry that there must be reemployment or a longer period of taxation. Preceding this remark, the Secretary declared that if a substantial measure of increased reemployment does not take place taxation for relief purposes will come largely from business earnings.

A 10-point program was offered by Mr. Roper for fields of study looking to reemployment. Because Administration sources have strongly indicated that industry would be asked to shorten hours of work without any change in the rate of pay, the suggestions made attracted particular attention in that they did not propose a fast and hard rule on this subject. Instead the program called for a study looking to maintenance of a balance between production, wages and hours of labor.

The suggestions made by Mr. Roper follow:

Business should survey its own needs and its own conditions from the viewpoint of employing as many persons as current improvements and future programs demand.

As improvements in productive efficiency are secured, business should

pass on to the consumer the benefits of the lower costs of production which result.

Business should form and launch industrial committees to study in a comprehensive way technological unemployment and methods for speeding up the transfer into other fields of earning capacity of workers replaced by machines.

Business should stimulate the durable goods industries by early action that will provide for capital goods and machinery replacements due to obsolescence, depreciation and other causes.

Business should develop effective and wisely engineered house-building programs, privately financed and managed and adapted to local needs, to foster better American home standards.

Business should launch more aggressive endeavors to expand our foreign trade all along the line and especially in cooperation with the Administration's reciprocal trade agreement program.

Business should have a research program, conducted by industry and business, for the purpose of informing business on a long-term useful public works plan looking to the coordination of proper national, state, local and private endeavors.

Business should make intensive research study of the relationships that should be maintained with respect to production, wages and hours of labor and the necessary methods and mechanics to be utilized in maintaining this balanced relationship.

Business must recognize and apply its best endeavors to a fundamental

educational program involving methods and efforts to get the states and subdivisions to reassume their social responsibilities as soon as possible, to study economies in government and the prompting of self-respect and mutual responsibility in the individuals and in the groups and organizations of our cities.

Business should utilize every possible channel of approach that will result in the most effective cooperation between business and government.

Mr. Roper expressed the conviction that as business fulfills these responsibilities employment will increase, relief demands decrease, national income will further expand and safe and secure recovery will be attained.

Westinghouse Moves Offices

THE Westinghouse Electric & Mfg. Co., Westinghouse Electric International Co. and the Westinghouse Lamp Co. have moved their New York executive and sales offices from 30 Rockefeller Plaza to the Westinghouse Building, 150 Broadway, New York.

The Foster Wheeler Corp., 165 Broadway, New York, and General Regulator Corp. have consolidated their sales departments. Distribution of General regulators will be made hereafter through the branch offices and agents of Foster Wheeler Corp., and all communications on the subject may be addressed to them. The sales headquarters of the General Regulator Corp. will be at the general offices of Foster Wheeler Corp., 165 Broadway, New York.

IRON AND STEEL SCRAP



... Composite eases slightly to \$14.54.

• • •

... All markets report weaker price undertone.

• • •

... Domestic and foreign buyers ignore market.

APRIL 28.—Several weeks ago it was reported that the highly bullish scrap market was showing signs of leveling off. Subsequently there was a slight price recovery, but during the past week this was cancelled and all indications point toward lower quotations. The major weakening factor has been the widespread mill apathy toward new purchases, and, of lesser influence, has been a general belief that mill operations are due for a reaction. Even though current price levels are unsteady, no drastic break in quotations is anticipated. An easy decline and subsequent leveling off not far below current averages is more likely.

Taking their cue from domestic buyers, exporters are refusing to meet brokers' bids for additional business. However, sizable tonnages are yet to be shipped abroad on old orders.

Pittsburgh

No. 1 steel remains nominal at \$15.50 to \$16. Large consumers are still out of the market, and some users are placing an embargo on shipments. Dealers are having no difficulty covering orders at \$15.50, and in some cases they have been able to pick lots at \$15. The market weakness can be ascribed to the absence of consumer buying, as there does not seem to be an overabundance of material. Meanwhile, specialties continue firm. Considerable interest is being evinced this week in the Pennsylvania Railroad list, closing on April 29, which contains almost 28,000 tons of material, including 8000 tons of No. 1.

Cleveland

Prices have declined 25c. a ton on heavy melting steel and compressed sheet steel and 50c. on blast furnace

scrap as a result of more liberal offerings and the absence of new consumer demand. However, even though the supply here is more plentiful, it is all being absorbed. Dealers in the Youngstown district are paying \$15.25 for No. 1 heavy melting steel and are reported to have covered for about all the scrap needed to fill their recent \$16 order. Considerable scrap is now coming to Cleveland from Detroit by water.

Chicago

The price structure is once again being undermined and most specialties are already affected. Brokers and dealers are able to buy No. 1 steel freely at \$14 a ton, delivered, and railroads cannot command more than \$14.50. Supplies are adequate for all immediate needs.

Boston

Scrap prices are definitely easier. For export, No. 1 steel is now not more than \$11.75, delivered army base, and No. 2 steel is much lower at \$10.75. No steel turnings for export have been bought here recently, but Providence, R. I., exporters are paying around \$5.25 a ton, f.o.b. yard. With Weirton buyers out of the market, turnings have dropped in price, and brokers have lowered bundled skeleton values because Pennsylvania mills have stopped buying.

Philadelphia

A report that the Japanese have again purchased at record price levels is unfounded. Inasmuch as Japan has about 60,000 tons of undelivered orders and is sufficiently market-wise to detect the current slight uneasiness in domestic prices, rumors of new Japanese activity are considered by many as propaganda to maintain a strong market. The one local broker buying for export has reduced his Port Richmond price for No. 1 to \$12.50. A

boat is currently loading 3000 tons for England, and another boat is expected early next month. The domestic market is somewhat softer. Several mills have been offered steel 50c. under quoted price levels, and published values have been revised accordingly even though very little new business has been booked.

New York

False rumors of heavy Japanese sales at high price levels have failed to influence this market. On the contrary, widespread softening of scrap all over the country has made all foreign buyers less willing to meet brokers' offers, and, consequently, there has been practically no new business placed during the past ten days by any country. At least 60,000 tons of scrap is due Japan on old orders, and England likewise has sizable commitments outstanding. Brokers continue to buy on barge against these old orders at prices practically unchanged from those ruling last week. Slight uneasiness in eastern Pennsylvania has been reflected to a moderate degree in dealer sales here.

St. Louis

An East Side mill bought between 5000 and 6000 tons of No. 2 steel at current price levels from four dealers for delivery over the next 60 days. Other consumers are expected to come into the market shortly. The St. Louis-San Francisco Railway sold 3000 tons and the Missouri-Kansas-Texas disposed of 1000 tons of scrap iron last week, most of which was taken by factors in this market.

Cincinnati

Mill reluctance to contract for scrap at the market and dealers' need to move accumulated material softened the market here last week. Bid schedules were reduced 25c. to 75c. a ton, while the trade adopted a watchful attitude toward developments. A few odd lots constituted the week's business, while other activity was confined to covering on old commitments.

Detroit

This market shows further weakness in the face of huge supplies coming from automobile plants now operating at peak production. A leveling off of steel mill operations is a further weakening factor.

Buffalo

After coming into the market at \$14 and \$14.50 for No. 1 heavy melting steel, the largest consuming interest has now dropped its price to \$13.50 and \$14. With Pennsylvania holding up shipments, the market has sagged slightly, but further purchasing is anticipated in this district from another interest. Republic Steel Corp. is holding up shipments on borings and turnings.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 hvy. mltng. steel...	\$15.50 to \$16.00
No. 2 hvy. mltng. steel...	14.00 to 14.50
No. 2 RR. wrought...	15.50 to 16.00
Scrap rails	15.75 to 16.25
Rails, 3 ft. and under...	16.50 to 17.00
Comp. sheet steel...	15.50 to 16.00
Hand bundled sheets...	14.00 to 14.50
Hvy. steel axle tngs...	13.50 to 14.00
Machine shop tngs...	10.50 to 11.00
Short shov. tngs...	10.50 to 11.00
Mixed bor. tngs...	8.25 to 9.25
Cast iron borings...	10.50 to 11.00
Cast iron carwheels...	14.00 to 14.50
Hvy. breakable cast...	13.00 to 13.50
No. 1 cast	15.00 to 15.50
RR. knuckles & cplrs...	17.25 to 17.75
Rail, coil & leaf springs	17.25 to 17.75
Rolled steel wheels...	17.25 to 17.75
Low phos. billet crops	18.00 to 18.50
Low phos. sh. bar...	17.50 to 18.00
Low phos. punchings...	17.00 to 17.50
Low phos. plate scrap...	17.00 to 17.50
Steel car axles	16.00 to 16.50

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 hvy. mltng. steel...	\$14.25 to \$14.75
No. 2 hvy. mltng. steel...	13.25 to 13.75
Comp. sheet steel...	13.25 to 13.75
Light bund. stampings	10.00 to 10.50
Drop forge flashings...	13.00 to 13.50
Machine shop turn...	8.50 to 9.00
Short shov. turn	8.75 to 9.00
No. 1 busheling	13.00 to 13.50
Steel axle turnings...	13.00 to 13.50
Low phos. billet crops	17.50 to 18.00
Cast iron borings...	8.75 to 9.00
Mixed bor. & turn...	8.75 to 9.00
No. 2 busheling	9.00 to 9.50
No. 1 cast	15.00 to 15.50
Railroad grate bars...	8.00 to 8.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	17.00 to 17.50
Rails for rolling	16.50 to 17.00
Railroad malleable...	17.75 to 18.50
Cast iron carwheels...	15.00

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 hvy. mltng. steel...	\$13.00 to \$13.50
No. 2 hvy. mltng. steel...	12.00 to 12.50
Hydraulic bund., new	13.00 to 13.50
Hydraulic bund., old...	10.50 to 11.00
Steel rails for rolling...	15.00 to 15.50
Cast iron carwheels...	14.00 to 14.50
Hvy. breakable cast...	13.00 to 13.50
No. 1 cast	13.50 to 14.00
Stove plate (steel wks)	11.50 to 12.00
Railroad malleable	17.50 to 18.00
Machine shop turn...	8.00 to 8.50
No. 1 blast furnace...	6.25
Cast borings	6.00
Heavy axle turnings...	11.50 to 12.00
No. 1 low phos. hvy...	17.00 to 17.50
Couplers & knuckles...	17.00 to 17.50
Rolled steel wheels...	17.00 to 17.50
Steel axles	16.50 to 17.00
Shafting	19.00 to 19.50
No. 1 RR. wrought...	15.00 to 15.50
Spec. iron & steel pipe	12.00 to 12.50
Bundled sheets	11.00 to 11.50
No. 1 forge fire	13.00 to 13.50
Cast borings (chem.)...	10.50 to 13.00

CHICAGO

Delivered Chicago district consumers:	
	Per Gross Ton
Hvy. mltng. steel...	\$14.25 to \$14.50
Auto. hvy. mltng. steel	12.00 to 12.50
Shoveling steel	14.00 to 14.50
Hydraul. comp. sheets	13.00 to 13.50
Drop forge flashings...	12.00 to 12.50
No. 1 busheling	12.75 to 13.25
Rolled carwheels	15.00 to 15.50
Railroad tires cut	15.00 to 15.50
Railroad leaf springs...	15.00 to 15.50
Axle turnings	12.75 to 13.25
Steel coup. & knuckles	15.00 to 15.50
Coil springs	15.50 to 16.00
Axle turn. (elec.)...	13.75 to 14.25
Low phos. punchings...	15.50 to 16.00
Low phos. plates, 12 in. and under	16.00 to 16.50
Cast iron borings	6.75 to 7.25
Short shov. turnings...	7.25 to 7.75
Machine shop turn...	6.50 to 7.00
Rerolling rails	14.75 to 15.25
Steel rails under 3 ft.	15.75 to 16.25
Steel rails under 2 ft.	16.25 to 16.75
Angle bars, steel...	15.50 to 16.00
Cast iron carwheels...	14.00 to 14.50
Railroad malleable	16.00 to 16.50
Agric. malleable	14.00 to 14.50
Per Net Ton	
Iron car axles	\$18.00 to \$18.50
Steel car axles	14.75 to 15.25
No. 1 RR. wrought...	12.50 to 13.00
No. 2 RR. wrought...	12.25 to 12.75

No. 2 busheling, old...	\$7.50 to \$8.00
Locomotive tires	12.00 to 12.50
Pipes and flues	8.00 to 8.50
No. 1 machinery cast...	12.50 to 13.00
Clean auto. cast	11.50 to 12.00
No. 1 railroad cast...	11.50 to 12.00
No. 1 agric. cast...	10.50 to 11.00
Stove plate	8.00 to 8.50
Grate bars	8.50 to 9.00
Brake shoes	8.75 to 9.25

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel...	\$13.50 to \$14.00
No. 2 hvy. mltng. steel...	12.00 to 12.50
Scrap rails	13.50 to 14.00
New hy. b'nded sheets	12.00 to 12.50
Old hydraul. bundles...	11.00 to 11.50
Drop forge flashings...	12.50 to 13.00
No. 1 busheling	12.00 to 12.50
Hvy. axle turnings...	12.00 to 12.50
Machine shop turn...	7.50 to 8.00
Knucklers & Couplers	16.00 to 16.50
Coil & leaf springs...	16.00 to 16.50
Rolled steel wheels...	16.00 to 16.50
Low phos. billet crops	16.50 to 17.00
Short shov. turnings...	8.25 to 8.75
Mixed bor. & turn...	8.25 to 8.75
Cast iron borings...	8.25 to 8.75
No. 2 bushellings	7.00
Steel car axles	14.00 to 14.50
Iron axles	12.50 to 13.00
No. 1 machinery cast...	14.00 to 14.50
No. 1 cupola cast...	13.00 to 13.50
Stove plate	11.00 to 11.50
Steel rails, under 3 ft.	16.25 to 16.75
Cast iron carwheels...	12.00 to 12.50
Railroad malleable	16.75 to 17.25
Chemical borings	9.00 to 9.50

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Hvy. melting steel...	\$11.00 to \$11.50
Scrap steel rails...	11.50 to 12.00
Short shov. turnings...	7.00
Stove plates	8.00
Steel axles	12.00 to 12.50
Iron axles	12.00 to 12.50
No. 1 RR. wrought...	8.50 to 9.00
Rails for rolling	12.50 to 13.00
No. 1 cast	12.00 to 12.50
Tramcar wheels	11.00 to 12.00

ST. LOUIS

Dealers' buying prices per gross ton delivered consumers' works:	
Selected hvy. steel...	\$12.50 to \$13.00
No. 1 hvy. melting...	12.25 to 12.75
No. 2 hvy. melting...	10.75 to 11.25
No. 1 locomotive tires	11.00 to 11.50
Misc. stand-sec. rails	13.00 to 13.50
Railroad springs	14.00 to 14.50
Bundled sheets	9.50 to 10.00
No. 2 RR. wrought...	12.25 to 12.75
No. 1 busheling	7.50 to 8.00
Cast bor. & turn...	4.50 to 5.00
Rails for rolling	13.75 to 14.25
Machine shop turn...	4.00 to 4.50
Heavy turnings	9.25 to 9.75
Steel car axles	13.00 to 13.50
Iron car axles	15.00 to 16.00
No. 1 RR. wrought...	10.50 to 11.00
Steel rails under 3 ft.	13.50 to 14.00
Steel angle bars	13.00 to 13.50
Cast iron carwheels...	11.00 to 11.50
No. 1 machinery cast...	11.25 to 11.75
Railroad malleable...	14.25 to 14.75
No. 1 railroad cast...	11.25 to 11.75
Stove plate	7.50 to 8.00
Agricul. malleable	12.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel...	\$11.50 to \$12.00
No. 2 hvy. mltng. steel...	9.50 to 10.00
Scrap rails for mltng.	11.00 to 11.50
Loose sheet clippings...	7.00 to 7.50
Bundled sheets	8.25 to 8.75
Cast iron borings...	6.25 to 6.75
Machine shop turn...	7.00 to 7.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	4.75 to 5.25
Rails for rolling	11.50 to 12.00
No. 1 locomotive tires	10.00 to 10.50
Short rails	14.50 to 15.00
Cast iron carwheels...	11.00 to 11.50
No. 1 machinery cast...	12.00 to 12.50
No. 1 railroad cast...	11.25 to 11.75
Burnt cast	8.25 to 8.75
Stove plates	8.25 to 8.75
Agricul. malleable	10.25 to 10.75
Railroad malleable	12.00 to 12.50

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel...	\$10.50 to \$11.00
No. 2 hvy. mltng. steel...	9.25 to 9.75
Borings and turnings...	6.25 to 6.75
Long turnings	6.25 to 6.75
Short shov. turnings...	6.75 to 7.25
No. 1 machinery cast...	\$14.50 to \$15.00

Automotive cast	\$13.75 to \$14.25
Hydraul. comp. sheets	11.25 to 11.75
Stove plate	8.75 to 9.25
New factory bushel...	10.00 to 10.50
Old No. 2 busheling...	5.50 to 6.00
Sheet clippings	8.50 to 9.00
Flashings	9.75 to 10.25
Low phos. plate scrap...	11.00 to 11.50

CANADA

Dealers' buying prices per gross ton:	
	Toronto Mon-treal
Hvy. melting steel...	\$7.50 \$7.00
Rails, scrap	8.50 8.00
Machine shop turn...	4.00 4.00
Boiler plate	7.00 6.00
Hvy. axle turnings...	4.50 4.00
Cast borings	5.00 4.50
Steel borings	4.00 4.00
Wrought pipe	4.00 4.00
Steel axles	8.50 9.00
Axles, wrought iron...	9.00 9.50
No. 1 machinery cast...	11.50 11.00
Stove plate	7.50 7.00
Standard carwheels	11.00 10.50
Malleable	7.00 7.00
Shoveling steel	6.50 6.00
Bushellings	6.00 5.50
Compressed sheets	6.50 6.00

YOUNGSTOWN

Per gross ton delivered consumers' yards:	
No. 1 hvy. mltng. steel...	\$15.50 to \$16.00
Hydraulic bundles	15.25 to 15.75
Machine shop turn...	10.50 to 11.00

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel...	\$9.50 to \$10.00
No. 2 hvy. mltng. steel...	8.50 to 9.00
Hvy. breakable cast...	9.00 to 9.50
No. 1 machinery cast...	10.00 to 10.50
No. 2 cast	8.75 to 9.00
Stove plate	7.25 to 7.50
Steel car axles	13.50 to 14.00
Shafting	14.50 to 14.75
No. 1 RR. wrought...	9.50 to 10.00
No. 1 wrought long...	8.50 to 9.00
Spec. iron & steel pipe	8.50 to 9.00
Forge fire	7.50 to 8.00
Rails for rollings...	11.00 to 12.00
Short shov. turnings...	5.00 to 5.50
Machine shop turn...	4.50 to 5.00
Cast borings	4.50 to 5.00
No. 1 blast furnace...	3.00 to 3.50
Cast borings (chem.)...	10.00 to 11.00
Unprepar. yard scrap...	6.25 to 6.75
Per gross ton, delivered local foundries:	
No. 1 machin. cast...	\$12.00
No. 1 hvy. cast cupola...	10.00
No. 2 cast	8.50
Add 50c. to 75c. to above quotations to secure North Jersey prices.	

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel...	\$9.15 to \$9.40
Scrap rails	9.15 to 9.40
No. 2 steel	8.50 to 8.75
Breakable cast	8.25 to 8.75
Machine shop turn...	3.90 to 4.15
Bund. skeleton, long...	7.25 to 7.30
Shafting	14.00 to 14.25
Cast bor., chemical...	5.00 to 7.00
Cotton ties	6.00 to 6.25
Per gross ton delivered consumers' yards:	
Textile cast	\$10.50 to \$11.00
No. 1 machin. cast...	10.50 to 11.00
Stove plate	9.00

EXPORT

Brokers' buying prices per gross ton:	
New York, delivered alongside barges	
No. 1 hvy. mltng. steel...	\$9.50 to \$10.00
No. 2 hvy. mltng. steel...	8.50 to 9.00
No. 2 cast	8.50 to 8.75
Stove plate	7.25 to 7.50
Rails (scrap)	11.00 to 11.25
Philadelphia, on cars at Port Richmond	
No. 1 heavy melting steel...	\$12.50
Boston, on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel...	\$11.50 to \$11.75
No. 2 hvy. mltng. steel...	10.50 to 10.75
Rails (scrap)	11.50 to 11.75
Machine shop turn...	5.25 to 5.75
Stove plate	7.25 to 7.50
New Orleans, on cars at Stuyvesant Dock	
No. 1 hvy. mltng. steel...	\$11.00 to \$11.50
No. 2 hvy. mltng. steel...	10.00 to 10.50
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mltng. steel...	\$10.75 to \$11.25
Compressed bundles	8.75 to 9.25

RAW AND SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

Per Gross Ton

Rerolling\$28.00
Forging quality 35.00

Delivered Detroit

Rerolling\$31.00
Forging 38.00

Billets Only F.o.b. Duluth

Rerolling\$30.00
Forging 37.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer\$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved 1.80c.
Universal 1.80c.
Sheared 1.80c.

Wire Rods

(Nos. 4 and 5)

Per Gross Ton

F.o.b. Pittsburgh\$38.00
F.o.b. Cleveland 38.00
F.o.b. Chicago 39.00
F.o.b. Anderson, Ind. 39.00
F.o.b. Youngstown 39.00
F.o.b. Worcester, Mass. 40.00
F.o.b. Birmingham 41.00
F.o.b. San Francisco 47.00
F.o.b. Galveston 44.00

FINISHED IRON AND STEEL

BARs, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh1.85c.
F.o.b. Chicago1.90c.
F.o.b. Gary1.90c.
F.o.b. Duluth2.00c.
Del'd Detroit2.00c.
F.o.b. Cleveland1.90c.
F.o.b. Buffalo1.95c.
Del'd Philadelphia2.16c.
Del'd New York2.20c.
F.o.b. Birmingham2.00c.
F.o.b. cars dock Gulf ports...2.25c.
F.o.b. cars Pacific ports.....2.40c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh1.70c.
F.o.b. Chicago1.75c.
F.o.b. Gary1.75c.
F.o.b. Moline, Ill.1.75c.
F.o.b. Cleveland1.75c.
F.o.b. Buffalo1.80c.
F.o.b. Birmingham1.85c.
F.o.b. cars dock Gulf ports...2.10c.
F.o.b. cars dock Pacific ports..2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh2.05c.
F.o.b. Chicago2.10c.
F.o.b. Gary2.10c.
Del'd Detroit2.20c.
F.o.b. Cleveland2.10c.
F.o.b. Youngstown2.10c.
F.o.b. Buffalo2.10c.
F.o.b. Birmingham2.10c.
F.o.b. cars dock Gulf ports...2.45c.
F.o.b. cars dock Pacific ports..2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh1.90c.
F.o.b. Chicago1.95c.
F.o.b. Gary1.95c.
F.o.b. Cleveland1.95c.
F.o.b. Youngstown1.95c.
F.o.b. Buffalo1.95c.
F.o.b. Birmingham1.95c.
F.o.b. cars dock Gulf ports...2.30c.
F.o.b. cars dock Pacific ports..2.30c.

Iron

F.o.b. Chicago1.80c.
F.o.b. Pittsburgh (refined)....2.10c.
Delivered New York2.05c.
Delivered Philadelphia2.10c.

Cold Finished Bars and Shafting*

Base per Lb.

F.o.b. Pittsburgh2.10c.
F.o.b. Chicago2.15c.
F.o.b. Gary2.15c.
F.o.b. Cleveland2.15c.
F.o.b. Buffalo2.20c.
Del'd Detroit2.30c.
Del'd eastern Michigan.....2.35c.

*In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

Base per Lb.

No. 10, f.o.b. Pittsburgh.....1.85c.
No. 10, f.o.b. Gary1.95c.
No. 10, del'd Detroit2.05c.
No. 10, del'd Philadelphia2.16c.
No. 10, f.o.b. Birmingham2.00c.
No. 10, f.o.b. cars dock Pacific ports2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh.....2.40c.
No. 24, f.o.b. Gary2.50c.
No. 24, del'd Detroit.....2.45c. to 2.60c.
No. 24, del'd Philadelphia2.71c.
No. 24, f.o.b. Birmingham.....2.55c.
No. 24, f.o.b. cars dock Pacific ports3.05c.
No. 24, wrought iron, Pittsburgh4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh...2.50c.
No. 10 gage, f.o.b. Gary2.60c.
No. 10 gage, f.o.b. Detroit.....2.70c.
No. 10 gage, del'd Philadelphia.2.81c.
No. 10 gage, f.o.b. Birmingham.2.65c.
No. 10 gage, f.o.b. cars dock Pacific ports3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh...2.95c.
No. 20 gage, f.o.b. Gary3.05c.
No. 20 gage, del'd Detroit.....3.15c.
No. 20 gage, del'd Philadelphia..3.26c.
No. 20 gage, f.o.b. Birmingham.3.10c.
No. 20 f.o.b. cars dock Pacific ports3.50c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh...3.10c.
No. 24, f.o.b. Gary3.20c.
No. 24, del'd Philadelphia3.41c.
No. 24, f.o.b. Birmingham3.25c.
No. 24, f.o.b. cars dock Pacific ports3.70c.
No. 24, wrought iron, Pittsburgh4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh3.40c.
F.o.b. Gary3.50c.
F.o.b. cars dock Pacific ports..4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh2.95c.
No. 20, f.o.b. Gary3.05c.
No. 20, f.o.b. Birmingham3.55c.
No. 20, f.o.b. cars dock Pacific ports3.55c.
No. 10, f.o.b. Pittsburgh2.35c.
No. 10, f.o.b. Gary2.45c.
No. 10, f.o.b. Birmingham2.95c.
No. 10, f.o.b. cars dock Pacific ports2.95c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh2.75c.
No. 28, Gary2.85c.
No. 28, cars dock Pacific Coast ports3.35c.

Tin Plate

Base per Box

Standard cokes, f.o.b. Pittsburgh district mill\$5.25
Standard cokes, f.o.b. Gary 5.35
Standard cokes, f.o.b. cars dock Pacific ports 5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.\$10.00
15-lb. coating I.C. 12.00
20-lb. coating I.C. 13.00
25-lb. coating I.C. 14.00
30-lb. coating I.C. 15.25
40-lb. coating I.C. 17.50

Hot-Rolled Hoops, Bands, Strips and Plates under 1/4 in.

Base per Lb.

All widths up to 24 in., Pgh....1.85c.
All widths up to 24 in., Chicago.1.95c.
All widths up to 24 in., del'd Detroit2.05c.
All widths up to 24 in., Birmingham2.00c.
Cooperage stock, Pittsburgh ..1.95c.
Cooperage stock, Chicago2.05c.

Plates

Base per Lb.

F.o.b. Pittsburgh1.80c.
F.o.b. Chicago1.85c.
F.o.b. Gary1.85c.
Del'd Cleveland1.995c.
F.o.b. Coatesville1.90c.
F.o.b. Sparrows Point1.90c.
Del'd Philadelphia1.99c.
Del'd New York2.09c.
F.o.b. Birmingham1.95c.
F.o.b. cars dock Gulf ports...2.20c.
F.o.b. cars dock Pacific ports..2.35c.
Wrought iron plates, f.o.b. Pittsburgh3.20c.

Floor Plates

F.o.b. Pittsburgh3.35c.
F.o.b. Chicago3.40c.
F.o.b. Coatesville3.45c.
F.o.b. cars dock Gulf ports...3.75c.
F.o.b. cars dock Pacific ports..3.90c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh1.80c.
F.o.b. Chicago1.85c.
Del'd Cleveland1.995c.
F.o.b. Buffalo1.90c.
F.o.b. Bethlehem1.90c.
Del'd Philadelphia2.015c.
Del'd New York2.0625c.
F.o.b. Birmingham (standard).1.95c.
F.o.b. cars dock Gulf ports ...2.20c.
F.o.b. cars dock Pacific ports..2.35c.

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh2.15c.
F.o.b. Chicago2.25c.
F.o.b. Buffalo2.25c.
F.o.b. cars dock Gulf ports...2.60c.
F.o.b. cars dock Pacific ports..2.60c.

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton.....\$36.37 1/2
Angle bars, per 100 lb. 2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton\$35.00
Light rails (from rail steel) per gross ton 34.00

Base per 100 Lb.

Spikes, 9/16 in. and larger\$2.60
Spikes, 1/2 in. and smaller 2.60
Tie plates, steel 1.90
Tie plates, Pacific Coast ports.. 2.00
Track bolts, to steam railroads.. 3.60
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbus, Pa., Richmond, Va.

Cold-Rolled Strips*

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.895c.
F.o.b. Worcester	2.80c.

* Carbon 0.25 and less.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.40c.
Spring wire	3.05c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	\$2.10
Smooth coated nails	2.10

	Base per 100 Lb.
Annealed fence wire	\$2.65
Galvanized fence wire	3.00
Polished staples	2.80
Galvanized staples	3.05
Barbed wire, galvanized	2.60
Twisted barless wire	2.60
Woven wire fence, base column	58
Single loop bale ties, base column	51

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base for all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh; Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel	Black Galv.	In.	Black Galv.
1/4	57	37	57
1/2	60	44 1/2	60
3/4	64 1/2	55	64 1/2
1	67 1/2	59	67 1/2
1 1/2	69 1/2	61 1/2	69 1/2

Lap Weld

Steel	Black Galv.	In.	Black Galv.
2	62	53 1/2	62
2 1/2	65	56 1/2	65
3 1/2	67	58 1/2	67
7	8.66	56 1/2	8.66
9	10.65 1/2	56	10.65 1/2
11	12.64 1/2	55	12.64 1/2

Butt Weld, extra strong, plain ends	Black Galv.	In.	Black Galv.
1/4	55 1/2	42 1/2	55 1/2
1/2	57 1/2	46 1/2	57 1/2
3/4	62 1/2	54 1/2	62 1/2
1	66 1/2	58 1/2	66 1/2
1 1/2	68	61	68

Lap Weld, extra strong, plain ends	Black Galv.	In.	Black Galv.
2	60	52 1/2	60
2 1/2	64	56 1/2	64
3 1/2	67 1/2	60	67 1/2
7	8.66 1/2	57	8.66 1/2
9	10.65 1/2	56	10.65 1/2
11 and 12	64 1/2	55	64 1/2

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	\$48.40
*4-in., del'd Chicago	51.40
6-in. and larger, del'd New York	45.20
4-in., del'd New York	48.20
*6-in. and larger, Birmingham	40.00
*4-in. Birmingham	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	48.50
4-in., f.o.b. dock, San Francisco or Los Angeles	51.00
F.o.b. dock, Seattle	51.50
Class "A" and gas pipe, \$3 extra.	

*Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$39 Birmingham, and \$47.40, delivered Chicago and 4-in. pipe, \$42, Birmingham, and \$50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. x 6 in. and smaller	70, 10 and 5
Larger than 1/2 in.	70 and 10
Lag bolts	70 and 10
Plow bolts, Nos. 1, 2, 3, and 7 heads	70 and 10
Hot-pressed nuts, blank or tapped, square	70 and 10
Hot-pressed nuts, blank or tapped, hexagon	70 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	70 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes to and incl.	
1 in. diameter	60, 20 and 15
Larger than 1 in. diameter	60, 20 and 15
Stove bolts in packages, nuts attached	72 1/2, 10 and 10
Stove bolts in packages, with nuts separate	72 1/2, 10, 10 and 5
Stove bolts in bulk	82 1/2
Tire bolts	55

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	\$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 3/4 in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	85
Upset set screws, cut and oval points	75 and 10
Milled studs	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Uncropped\$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, \$49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is \$52. F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base2.45c. Delivered price at Detroit is ..2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1/2% Nickel)	\$0.25
2100 (2 1/4% Nickel)	0.95
2300 (3 1/4% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel...base	
6100 Chromium Vanadium Bar..1.10c.	
6100 Chromium Vanadium Spring Steel	\$0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars 1/2c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/4 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% Ni. 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20 1/4c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

Base per Lb.

High speed	57c.
High carbon chrome	37c.
Oil hardening	22c.
Extra	17c.
Regular	14c.

Prices are same for warehouse distribution to all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

British and Continental Prices BRITISH

Per Gross Ton f.o.b. United Kingdom Ports Based on exchange rate as of April 13.

Ferromanganese, ex-port	\$44.48
Billets, open-hearth	29.03 to \$30.27
Tin plate, per base box	4.63 to 4.99
Steel bars, open-hearth	38.91
Beams, open-hearth	37.69
Channels, open-hearth	38.91
Angles, open-hearth	37.69
Black sheets, No. 24 gage	47.07
Galvanized sheets, No. 24 gage	59.96

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports Based on exchange rate of April 27.

Billets, Thomas	\$19.22
Wire rods, No. 5 B.W.G.	36.81
Steel bars, merchant	26.58
Sheet bars	19.63
Plate, 1/4 in. and up	35.38
Plate, 3/16 in. and 5 mm.	34.76
Sheets, 1/4 in.	36.81
Beams, Thomas	25.56
Angles (Basic)	25.56
Hoops and strip base	32.71
Wire, plain, No. 8	43.97
Wire nails	47.03
Wire, barbed, 4 pt. No. 10 B.W.G.	70.57

PIG IRON AND RAW MATERIALS

PIG IRON

No. 2 Foundry	
F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.....	\$20.50
Delivered Boston Switching District.....	21.00
Delivered Brooklyn.....	22.9289
Delivered Newark or Jersey City.....	21.9873
Delivered Philadelphia.....	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.....	19.50
F.o.b. Jackson, Ohio.....	21.25
Delivered Cincinnati.....	20.5807
Delivered Canton, Ohio.....	20.8482
Delivered Columbus, Ohio.....	21.64
Delivered Mansfield, Ohio.....	21.3832
Delivered Indianapolis.....	21.9289
Delivered South Bend, Ind.....	21.6935
Delivered Milwaukee.....	20.57
Delivered Davenport, Iowa.....	21.3832
Delivered Kansas City.....	22.2178
F.o.b. Duluth.....	20.00
Delivered St. Paul.....	21.94
F.o.b. Provo, Utah.....	17.50
Delivered San Francisco, Los Angeles or Seattle.....	22.315
F.o.b. Birmingham.....	15.50

*Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland and Steelton, Pa., and Sparrows Point, Md.....	\$20.00
Delivered Boston Switching District.....	20.50
Delivered Newark or Jersey City.....	21.4873
Delivered Philadelphia.....	20.8132
F.o.b. Buffalo.....	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.....	19.00
Delivered Cincinnati.....	20.0807
Delivered Canton, Ohio.....	20.3482
Delivered Mansfield, Ohio.....	20.8832
F.o.b. Jackson, Ohio.....	20.75
F.o.b. Provo, Utah.....	17.00
F.o.b. Birmingham.....	14.50

Bessemer

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa.....	\$21.50
Delivered Boston Switching District.....	22.00
Delivered Newark or Jersey City.....	22.9873
Delivered Philadelphia.....	22.3132
F.o.b. Buffalo and Erie, Pa. and Duluth.....	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Birmingham.....	20.00
Delivered Cincinnati.....	21.0807
Delivered Canton, Ohio.....	21.3482
Delivered Mansfield, Ohio.....	21.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.....	\$24.00
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Gray Forge

Valley furnace.....	\$19.00
Pittsburgh district furnace.....	19.00

Charcoal

Lake Superior furnace.....	\$22.00
Delivered Chicago.....	25.2528
Delivered Buffalo.....	25.595

Canadian Pig Iron

Per Gross Ton	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$21.00
No. 2 fdy., sil. 1.75 to 2.75.....	20.50
Malleable.....	22.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.50
No. 2 fdy., sil. 1.75 to 2.25.....	22.00
Malleable.....	22.50
Basic.....	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.....	
Per Gross Ton	
Domestic, 80% (carload).....	\$75.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%.....	\$26.00
50-ton lots 3-mo. shipment.....	24.00
F.o.b. New Orleans.....	26.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads).....	\$77.50
50% (ton lots).....	85.00
75% (carloads).....	126.00
75% (ton lots).....	130.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
6.00 to 6.50%.....	\$22.75
6.51 to 7.00%.....	23.25
7.01 to 7.50%.....	23.75
7.51 to 8.00%.....	24.25
8.01 to 8.50%.....	24.75
8.51 to 9.00%.....	25.25
9.01 to 9.50%.....	25.75
9.51 to 10.00%.....	26.25
10.01 to 10.50%.....	26.75
10.51 to 11.00%.....	27.25
11.01 to 11.50%.....	27.75
11.51 to 12.00%.....	28.25

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
10.00 to 10.50%.....	\$27.75
10.51 to 11.00%.....	28.25
11.01 to 11.50%.....	28.75
11.51 to 12.00%.....	29.25
12%.....	30.25

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads.....	\$1.30
Ferrotungsten, lots of 5000 lb.....	1.35
Ferrotungsten, smaller lots.....	1.40
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract.....	10.00c.
Ferrocromium, 2% carbon.....	16.50c. to 17.00c.
Ferrocromium, 1% carbon.....	17.50c. to 18.00c.
Ferrocromium, 0.10% carbon.....	19.50c. to 20.00c.
Ferrocromium, 0.06% carbon.....	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained V.....	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.....	\$2.50
Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton.....	\$137.50
Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....	142.50

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton.....	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.....	75.00
Ferromolybdenum, per lb. Mo del.....	95c.
Calcium molybdate, per lb. Mo del.....	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads.....	\$28.00
Ton lots or less, per ton.....	45.50
Silico-manganese, gross ton, delivered.....	
2.50% carbon grade.....	85.00
2% carbon grade.....	90.00
1% carbon grade.....	100.00
Spot prices.....	\$5 a ton higher

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50% iron.....	\$4.80
Old range, non-Bessemer, 51.50% iron.....	4.65
Mesabi, Bessemer, 51.50% iron.....	4.65
Mesabi, non-Bessemer, 51.50% iron.....	4.50
High phosphorus, 51.50% iron.....	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% iron dry Spanish or Algeria.....	10.25c.
Iron, low phos., Swedish, average, 68½% iron.....	10.25c.
Iron, basic or foundry, Swedish, aver. 65% iron.....	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron.....	Nominal
Manganese, Caucasian, washed 52%.....	26c.
Manganese, African, Indian, 44-48%.....	25c.
Manganese, African, Indian, 49-51%.....	26c.
Manganese, Brazilian, 46 to 48½%.....	24c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered, nominal.....	\$16.00
Tungsten, domestic, scheelite delivered, nominal.....	16.00

Per Gross Ton	
Chrome, 45% Cr ₂ O ₃ , lamp, c.i.f. Atlantic Seaboard (African).....	\$17.50
45 to 46% Cr ₂ O ₃ (Turkish).....	\$16.50 to 17.00
48% Cr ₂ O ₃ (African).....	20.50
48% min. Cr ₂ O ₃ (Turkish).....	19.25
Chrome concentrate, 50% and over Cr ₂ O ₃ , c.i.f. Atlantic Seaboard.....	22.00
52% Cr ₂ O ₃ (Turkish).....	21.75
48 to 49% Cr ₂ O ₃ (Turkish).....	19.25

FLUORSPAR

Per Net Ton	
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all rail shipment.....	\$18.00
Domestic, barge and rail shipment.....	19.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines.....	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid.....	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines.....	25.00

FUEL OIL

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate.....	4.25c.
No. 4 industrial.....	3.87½c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate.....	4.25c.
No. 4 industrial.....	3.87½c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil.....	5.00c.
No. 5 industrial fuel oil.....	3.77c.
Per Gal. f.o.b. Cleveland	
No. 3 distillate.....	6.00c.
No. 4 industrial.....	5.75c.
No. 5 industrial.....	5.25c.

COKE AND COAL

Coke	
	Per Net Ton
Furnace, f.o.b. Connells-ville Prompt	\$3.65 to \$3.80
Foundry, f.o.b. Connells-ville Prompt	4.25 to 5.75
Foundry, by-product, Chicago ovens, for delivery outside switching district	9.00
Foundry, by-product, delivery in Chicago switching district	9.75
Foundry, by-products, New England, delivered	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.65
Foundry, by-product, Philadelphia	9.38
Foundry, by-product, Cleveland, delivered	9.75
Foundry, by-product, Cincinnati, del'd	9.50
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.90 to 2.10
Gas coal, 1/4-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

REFRACTORIES

Fire Clay Brick		
	Per 1000 f.o.b. Works	
		Inter- High-heat Duty Brick
Pennsylvania	\$45.00	\$40.00
Maryland	45.00	40.00
New Jersey	50.00	43.00
Ohio	40.00	35.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$45.00
Chicago District	54.00
Birmingham	\$48.00 to 50.00
Silica cement per net ton	8.00

Chrome Brick	
	Per Net Ton
Standard f.o.b. Baltimore and Plymouth Meeting and Chester, Pa.	\$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick	
	Per Net Ton
Standard, f.o.b. Baltimore and Chester, Pa.	\$65.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite	
	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.95c.
Reinforcing steel bars	2.95c.
Cold-finished and screw stock:	
Rounds and hexagons	3.35c.
Squares and flats	3.35c.
Hoops and bands under 1/4 in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.69
Spikes, large	3.10c.
Track bolts, all sizes, per 100 count	.65 per cent off list
Machine bolts, 100 count	.65 per cent off list
Carriage bolts, 100 count	.65 per cent off list
Nuts, all styles, 100 count	.65 per cent off list
Large rivets, base per 100 lb.	\$3.80
Wire, black, soft ann'd, base per 100 lb.	2.90c.
Wire, galv. soft, base per 100 lb.	3.25c.
Common wire nails, per keg	2.35c.
Cement coated nails, per keg	2.35c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars, rounds	3.00c.
Soft steel bars, squares and hexagons	3.15c.
Cold-fin. steel bars:	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.

	Per Cent Off List
Machine bolts	*70
Carriage bolts	*70
Lag screws	*70
Hot-pressed nuts, sq. tap or blank	*70
Hot-pressed nuts, hex. tap or blank	*70
Hex. head cap screws	87 1/2
Cut point set screws	75 and 10
Flat head bright wood screws	70
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57 1/2
Wrought washers	\$4.50 off list
Black ann'd wire per 100 lb.	\$3.85
Com. wire nails, base per keg	2.95†
Cement c't'd nails, base per keg	2.95†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, rounds	3.31c.
Iron bars	3.31c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.

Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.81c.
Flats and squares	3.81c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheets (No. 10)	3.31c.
Hot-rolled ann'd sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24*)	Special
Long terme sheets (No. 24)	5.25c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x 1/4 in. and larger	3.75c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	\$3.21

Per Cent Off List

Machine bolts, square head and nut:	
All diameters	.65 and 10
Carriage bolts, cut thread:	
All diameters	.65 and 10
Boiler tubes:	
	Per 100 Ft.
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.45c.
Bars, soft steel (rounds and flats)	3.25c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.40c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Hot-rolled annealed sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.65c.
Hot-rolled sheets (No. 10)	3.30c.
Black corrug. sheets (No. 24)	4.10c.
*Galv. corrug. sheets	4.65c.
Structural rivets	4.00c.
Boiler rivets	4.10c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	65
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	3.03c.
†Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.76c.
*Steel hoops	3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	3.18c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.65c.
†Galvanized sheets (No. 24)	4.40c.
*Hot-rolled annealed sheets (No. 10)	3.08c.
Diam. pat. floor plates, 1/4 in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

†For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.50c.
Flat-rolled steel under 1/4 in.	3.36c.
Cold-finished strip	\$3.00c.

Hot-rolled annealed sheets
(No. 24)..... 3.91c.
Galvanized sheets (No. 24)..... 4.61c.
Hot-rolled sheets (No. 10)..... 3.11c.
Hot-rolled 3/16 in. 24 to 48 in.
wide sheets 3.56c.
*Black ann'd wire, per 100 lb. \$2.40
*No. 9 galv. wire, per 100 lb. 2.75
*Com. wire nails, base per keg. . 2.35

†Outside delivery 10c. less.
*For 5000 lb. or less.

CINCINNATI

Base per Lb.
Plates and struc. shapes..... 3.42c.
Bars, rounds, flats and angles. 3.22c.
Other shapes..... 3.37c.
Rail steel reinforc. bars..... 3.25c.
Hoops and bands, 3/16 in. and
lighter 3.47c.
Cold-finished bars..... 3.72c.
Hot-rolled annealed sheets
(No. 24)..... 4.02c.
Galv. sheets (No. 24)..... 4.72c.
Hot-rolled sheets (No. 10).... 3.22c.
Structural rivets..... 4.35c.
Small rivets..... .55 per cent off list
No. 9 ann'd wire, per 100 lb.
(1000 lb. or over)..... \$2.88
Com. wire nails, base per keg:
Any quantity less than carload. 3.04
Cement c't'd nails, base 100-lb.
keg 3.50
Chain. lin. per 100 lb. 8.35
Net per 100 Ft.
Seamless steel boiler tubes,
2-in. \$20.37
4-in. 48.14
Lap-welded steel boiler tubes,
2-in. 19.38
4-in. 45.32

BUFFALO

Base per Lb.
Plates 3.88c.
Struc. shapes..... 3.25c.
Soft steel bars..... 3.05c.
Reinforcing bars..... 2.60c.
Cold-fin. flats and sq. 3.55c.
Rounds and hex. 3.55c.
Cold-rolled strip steel..... 3.19c.
Hot-rolled annealed sheets
(No. 24) 4.06c.
Heavy hot-rolled sheets (3/16
in., 24 to 48 in. wide)..... 3.63c.
Galv. sheets (No. 24) 4.70c.
Bands 3.43c.
Hoops 3.43c.
Heavy hot-rolled sheets 3.18c.
Com. wire nails, base per keg. \$3.15
Black wire, base per 100 lb.
(2500-lb. lots or under) 3.50
(Over 2500 lb.) 3.40

BOSTON

Base per Lb.
Beams, channels, angles, tees,
zees 3.54c.
H beams and shapes 3.54c.
Plates—Sheared, tank, and
univ. mill, ¼ in. thick and
heavier 3.56c.
Floor plates, diamond pattern. 5.36c.
Bar and bar shapes (mild
steel) 3.45c.
Bands 3/16 in. thick and
No. 12 ga. incl. 3.65c. to 4.65c.
Half rounds, half ovals, ovals
and bevels 4.70c.
Tire steel 4.70c.
Cold-rolled strip steel 3.245c.
Cold-finished rounds, squares
and hexagons 3.90c.
Cold-finished flats 3.90c.
Blue annealed sheets, No. 10
ga. 3.65c.
One pass cold-rolled sheets
No. 24 ga. 4.20c.
Galvanized steel sheets, No.
24 ga. 4.90c.
Lead coated sheets, No. 24 ga 5.85c.

Price delivered by truck in metro-
politan Boston, subject to quantity
differentials.

DETROIT

Base per Lb.
Soft steel bars 3.09c.
Structural shapes 3.42c.
Plates 3.42c.
Floor plates 5.17c.
Hot-rolled annealed sheets
(No. 24) 3.94c.
Hot-rolled sheets (No. 10) 3.14c.

Galvanized sheets (No. 24)**.. 4.72c.
Bands 3.39c.
Hoops 3.39c.
†Cold-finished bars 3.64c.
Cold-rolled strip 3.18c.
Hot-rolled alloy steel (S.A.E.
3100 Series) 5.29c.*
Bolts and nuts, in cases,
70 and 10 per cent off list
Broken cases 70 per cent off

Prices delivered by truck in metro-
politan Detroit, subject to quantity
differentials.

*Price applies to 1,000 lb. and
over.
†With reduction in chemical ex-
tras.

**0.25c. off list for 10 to 25 bundles;
0.50c. for 25 bundles and over, De-
troit delivery only.

MILWAUKEE

Base per Lb.
Plates and structural shapes.. 3.31c.
Soft steel bars, rounds up to 8
in., flats and fillet angles.... 3.11c.
Soft steel bars, squares and
hexagons 3.26c.
Hot-rolled strip 3.41c.
Hot-rolled sheets (No. 10).... 3.16c.
Hot-rolled annealed 3/16—24 in.
to 48 in. wide incl. 3.41c.
Hot-rolled annealed sheets
(No. 24) 3.96c.
Galvanized sheets (No. 20) 4.66c.
Cold-finished steel bars..... 3.61c.
Cold-rolled strip 3.33c.
Structural rivets (keg lots) ... 3.86c.
Boiler rivets, cone head (keg
lots) 3.96c.
Track spikes (keg lots) 3.91c.
Track bolts (keg lots) 4.91c.
Black annealed wire 3.15c.
Com. wire nails 2.60c.
Cement coated nails 2.60c.

Per Cent Off List

Machine bolts, ½x6 and smaller... 70
Larger than ½x6, 65 and 10
Hot-pressed nuts, sq. and hex.
tapped or blank (keg lots) 65 and 10

Prices given above are delivered
Milwaukee.

On plates, shapes, bars, hot-rolled
strip and heavy hot-rolled sheets,
the base applies on orders of 400 to
9999 lb. On galvanized and No. 24
hot-rolled annealed sheets the prices
given apply on orders of 400 to 1500
lb. On cold-finished bars the prices
are for orders of 1000 lb. or more of
a size.

ST. PAUL

Base per Lb.
Mild steel bars, rounds 3.25c.
Structural shapes 3.45c.
Plates 3.45c.
Cold-finished bars 4.02c.
Bands and hoops 3.55c.
Hot-rolled annealed sheets,
No. 24 3.90c.
Galvanized sheets, No. 24..... 4.50c.
Cold-rolled sheets, No. 20 4.95c.

On mild steel bars, shapes, plates
and hoops and bands the base ap-
plies on 400 to 14,999 lb. On hot-
rolled sheets, galvanized sheets and
cold-rolled sheets base applies on
15,000 lb. and over. Base on cold-
finished bars is 1000 lb. and over of a
size.

BALTIMORE

Base per Lb.
*Mild steel bars 3.00c.
**Reinforcing bars 2.85c.
*Structural shapes 3.00c.
†Plates 3.00c.
†Hot-rolled sheets, No. 10.... 3.10c.
†Hot-rolled annealed sheets,
No. 24 3.60c.
†Galvanized sheets, No. 24.... 4.30c.
*Bands 3.20c.
*Hoops 3.45c.
§Cold-rolled rounds 3.73c.
§Cold-rolled squares, hex. and
flats 3.73c.
Rivets 4.40c.
Bolts and nuts, per cent off list
60 and 10

*Quantity extras per size apply.
†Quantity extras per thickness apply.
Hot-rolled quantity extras are: 2000

lb. and over, base: 1500 lb. to 1999 lb.
add 15c. per 100 lb.; 1000 lb. to 1499
lb. add 30c.; 0 to 999 lb., add 50c.
‡25 bundles and over, base. For 1
to 9 bundles add 50c. per 100 lb.; for
10 to 24 bundles add 25c.
§Base for 1000 lb. and over. For
500 to 999 lb. add 25c. per 100 lb.;
for 300 to 499 lb. add \$1.00; for 0 to
299 lb. add \$1.75; for combined order
under 100 lb. add \$3.00.

**For orders 4000 lb. to 9999 lb.
Add 15c. per 100 lb. for orders 2000
to 3999 lb.; add 65c. for orders less
than 2000 lb.

CHATTANOOGA

Base per Lb.
Mild steel bars 3.36c.
Iron bars 3.36c.
Reinforcing bars 3.36c.
Structural shapes 3.56c.
Plates 3.56c.
Hot-rolled sheets, No. 10..... 3.36c.
Hot-rolled annealed sheets
No. 24 4.16c.
Galvanized sheets, No. 24..... 4.86c.
Steel bands 3.61c.
Cold-finished bars 4.13c.

MEMPHIS

Base per Lb.
Mild steel bars 3.47c.
Shapes, bar size 3.47c.
Iron bars 3.47c.
Structural shapes 3.67c.
Plates 3.67c.
Hot-rolled sheets, No. 10..... 3.47c.
Hot-rolled annealed sheets,
No. 24 4.27c.
Galvanized sheets, No. 24 4.80c.
Steel bands 3.72c.
Cold-drawn rounds 3.89c.
Cold-drawn flats, squares,
hexagons 5.89c.
Structural rivets 4.25c.
Bolts and nuts, per cent off list 65
Small rivets, per cent off list. 50

NEW ORLEANS

Base per Lb.
Mild steel bars 3.35c.
Reinforcing bars 3.50c.
Structural shapes 3.55c.
Plates 3.55c.
Hot-rolled sheets, No. 10 3.55c.
Hot-rolled annealed sheets,
No. 24 4.35c.
Galvanized sheets, No. 24 4.95c.
Steel bands 3.95c.
Cold-finished steel bars 4.30c.
Structural rivets 4.25c.
Boiler rivets 4.25c.
Common wire nails, base per
keg \$2.65
Bolts and nuts, per cent off list 70

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and			
U. M.	3.25c.	3.60c.	3.80c.
Shapes, standard	3.25c.	3.60c.	3.80c.
Soft steel bars..	3.25c.	3.60c.	3.95c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports..	2.45c.	2.45c.	2.45c.
Hot-rolled an- nealed sheets (No. 24)	4.10c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.35c.	3.70c.	3.75c.
Galv. sheets (No. 24 and lighter)	4.50c.	4.40c.	5.00c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.60c.	5.00c.
Cold finished steel			
Rounds	5.80c.	5.85c.	6.00c.
Squares and hexagons.	7.05c.	7.10c.	7.25c.
Flats 7.55c.	7.60c.	8.25c.	
Common wire nails—base per keg less carload	\$2.90	\$2.90	\$2.90

All items subject to differentials
for quantity.



... *Mid-west areas show buying inclination.*

o o o

... *The machine tool industry has its house in good order.*

o o o

... *Lower credit costs would increase buying of replacement equipment.*

o o o

By L. M. WAITE

o o o

THE average machine tool order book holds neither dearth nor excess of unfilled business necessary to carry the industry comfortably over the next few months. In active inquiry files there is a volume of prospective business probably never before reached. The inclination to buy replacement equipment for plants and shops over wide areas is strong.

Development of unit designs and parts interchangeability between sizes of machines, together with revamped manufacturing and assembly facilities, have served to place machine tool building more nearly on a production basis which only a few years ago was considered impossible.

Among builders the opinion prevails that the industry is 100 to 300 per cent better equipped to take care of the exacting requirements of shop demand, including the added element of machine flexibility, than at any time heretofore.

As to distribution, well established dealers profess a greatly widened salesman familiarity with production problems. Concerted study on new materials and methods has been a routine of sales organizations during the slow months, with a result that salesman license to suggest equipment and methods

has taken on a broader standing from the viewpoint of shop discussions.

In the field of financing machine tool purchases, particularly of a replacement nature, it is said that there is still much to be desired. One manufacturer states that he could immediately close, in eastern areas alone, \$150,000 in his production lines, were it possible for small and medium sized shops to obtain, for example through FHA guarantees, the equivalent of money rates enjoyed by municipalities because of Federal liberality. A potential replacement market was summarized in THE IRON AGE, March 28, 1935, page 38. The surface of that market has been scarcely scratched by the buying of the past few months.

Chicago

The week has shown a substantial demand for first-class used machines. Several dealers report sharp order increases for new machines in standard lines with the probability that April will be a banner month; one dealer believes that it may set an all-time record. Punch presses are becoming active. Larger buying seems to be against lists which have not been released in anything like entirety. Tractor builders continue buying as needed. One manufacturer of production

lathes reports a heavy district week with orders running four to six machine units each, deliveries two to five months.

Philadelphia

Dealer sources look for little change in existing conditions of reasonably satisfactory business volume during the next few weeks. It is held to be unlikely that the present single tool buying will be particularly disturbed by the rising tide of political activity.

Detroit

Ford figures in new machine tool buying activity in a rather big way this week; inquiries were active on equipment for a small motor line and also for rear axle production. Packard and Chrysler both are still debating a number of miscellaneous items. Dodge Brothers Division came out with a number of inquiries in further boosting the immediate order outlook which last week appeared to be quieting down temporarily.

Cincinnati

The week's orders in grinding and milling equipments have returned those departments of machine tool activity to their positions of two weeks ago. There was a small decline in the purchase of drilling machinery over the previous week, which was particularly active. Several important heavy tool orders are said to be in sight. Lathe demand continues fair and well within capacity. Total bookings maintain previous averages. There is constant call for skilled labor and plant managements are pressing for a well planned apprentice training program.

Cleveland

The automotive field has added a large volume of press inquiries to the prospective files of Cleveland manufacturers. The amount is estimated at \$2,000,000. A local manufacturer of automatic machinery is operating two shifts per day without any appreciable change in volume of orders on hand. Demand is well distributed and is said primarily to involve single machines for replacement purposes.

Toledo, Ohio

Machine tool business is holding well in the district with a large volume of new inquiries receiving dealer attention. Delayed deliveries are a drawback in some instances with buyer hesitancy as to future commitments showing an increasing tendency.

Iron and Steel Engineers

(CONCLUDED FROM PAGE 46)

records to full scale the temperature of a hot body in about half a second, and in many plants a series of these optomatics are rigged up so that a complete history of the shape from the time it is started through the rolls to the finish is recorded. The operation is the result of varying a filament with the color of the hot object, and proper calibration having been made, a direct reading on a meter gives an accurate temperature. Mr. Krogh was highly optimistic about the use of such an instrument in hot strip rolling mills.

From an analysis of records the best rolling temperatures for different gages, sizes, etc., can be determined, enabling exact duplication on such subsequent runs. It makes possible a permanent temperature record of the mill output. This is particularly valuable in the case of alloy steels and for all special orders.

Control of Refractories

Mr. Trostel speaking on refractories was of the opinion that the refractory manufacturer has progressed rather far in his knowledge of how to induce and control the properties of his materials, and an objective to be pursued in the future is to cooperate with the trained refractories engineers, gradually filtering into the steel industry. In his talk, he brought up to date the progress made by refractory engineers, emphasizing his points with a moving picture, showing the manufacture of certain types of bricks and other refractory material. Mr. Trostel continued that the improved refractories used by the steel industry today have not necessitated resort to new raw materials. This situation has been accomplished by drawing upon the accumulation of data on fundamental properties of the well-known refractory oxides and reducing these data to a practical basis. Changes in many of the older unit operations in manufacturing have resulted, such as controlled grain size, more thorough incorporation of the plastic bonding materials, de-airing of both stiff mud and dry press batches, increasing the volume of stability of the brick and the application of extremely high molding pressures, as in the production of unburned basic brick. Increase in bulk density of the finished product has been the objective of most of the processing changes.

One of the modern developments in brick pressing which has

brought good results, according to Mr. Trostel, has been the de-airing of bricks. Slides showing the use of ritex brick, which is high in bulk density compared with other



L. S. TROSTEL

bricks not put through the same processes, were shown, after having been submitted to vigorous tests. Apparently lack of proper de-airing brings with it unsatisfactory life of the brick, due to continual cracking and breaking off.

Perfecting Control of Tension

Undoubtedly the scientific study of effects of tension and the perfection of its control will play a stellar role in the quest for higher roll speeds, better gage accuracy and greater production of fine



F. MOHLER

quality strip steel, was the keynote of Mr. Mohler's talk.

The usual tension reel control consists of a regulator which maintains a constant armature current by controlling the field of its driving motor and slowing it down as the coil builds up. The question is frequently asked as to how much range of tension control can be obtained. The usual answer, according to the speaker is from 20 to 100 per cent. The regulator will hold any current down to practically zero. However, it is very misleading to say that zero, or even 10 per cent, tension can be maintained. It is obvious that a very small change in friction load or any motor losses represents a large percentage change in tension.

Constant current regulators are also frequently used for maintaining a "constant tension" between stands. While it might appear that the same method of control as is used for reels is equally applicable to tandem mills, there is a vast difference in the tension control in these two cases.

In the tension reel drive, said Mr. Mohler, the entire current input to the motor less a relatively small portion consisting of motor losses and that used in overcoming friction, goes into tension in the strip. However, the current input to the main drive of the tandem mill goes largely into that required by the rolling load and only a small portion goes into tension. This may be of the order of 90 per cent of rolling load and 10 per cent for tension. The regulator cannot differentiate between rolling load and tension load, and all it can do is to maintain total current input. Thus, the only way tension can be maintained constant between stands is to increase the tension pace and use its measurement for regulating operation. A device for this purpose has been perfected and is used in successful operation.

The device consists of an accurately ground roll equipped with self-aligning anti-friction bearings, each of which is resiliently supported by a pedestal. This is mounted midway between stands and a few inches above the pass line. The strip passes over the roller and presses downward. A small pressure on the roll represents a high tension in the strip. Any deflection of the roll operates a very sensitive air gap transformer which produces a current proportional to the deflection, and, therefore, the tension. This is the same principle used in the extremely accurate Electro Limit continuous gage, said Mr. Mohler. Automatic gage control and new type regulators were discussed in detail.

FINANCIAL NOTES

Accumulated dividend arrearages on the preferred stock of Crucible Steel Co. of America will not be liquidated until \$5,500,000 of debenture bonds are retired. H. S. Wilkinson, chairman, informed stockholders who attended the annual meeting held April 15, that while it was not necessary to meet these obligations until maturity, the management felt it was wise to provide for their retirement as early as possible. Since last November, \$4,500,000 of debenture bonds have been retired, leaving a balance of \$5,500,000, which are not due until May, 1940.

Edward G. Budd Mfg. Co., Philadelphia, had first-quarter operating profit of \$346,250, compared with \$151,589 in the first quarter of 1935. All charges, including depreciation, interest and taxes, were deducted. Additional profit in amount of \$638,000 resulted from sale by Budd International Corp. of its interest in British Pressed Steel Co.

Budd Wheel Co., Philadelphia, had a profit in the first quarter of \$208,605 after all charges, including depreciation, interest and taxes, equal to 19c. a share on common stock outstanding after allowance for preferred dividends. This compares with profit of \$291,920 for the same quarter last year.

Pittsburgh Screw & Bolt Co., Pittsburgh, in the quarter ended March 31, had net profit of \$165,056, compared with net loss of \$83,218 in same period last year.

Virginia Iron, Coal & Coke Co., Roanoke, Va., in the quarter ended March 31, had net loss of \$21,446, against net profit of \$8,950 in same quarter last year.

Doehler Die Casting Co., Toledo, in the first quarter had net earnings of \$209,623, equivalent to 86c. a share on 206,195 shares of common stock after three-months' dividend provisions on preferred and preference stock. In the same quarter of 1935 net earnings were \$172,722. Taxes for the period increased from \$32,350 in 1935 to \$50,235 in 1936.

Michigan Steel Tube Products Co., Detroit, in the first quarter had net profit after all charges and Federal tax reserves of \$120,677, equal to 60c. a share on 200,000 shares of common stock outstanding. This compares with net profit of \$116,243 for the like quarter of 1935.

American Stove Co., St. Louis, had 1935 net earnings of \$637,319, with provision for estimated income taxes of \$78,655. In 1934 net earnings were \$132,418. According to company report, sales of domestic ranges in 1935 were 50 per cent greater than in the preceding year.

General Motors Corp., New York, reports net earnings from operations for the year 1935 of \$167,226,510, compared with \$94,769,131 in 1934. After regular

preferred dividends of \$9,178,220, there remained \$158,048,290 as amount earned on the common stock outstanding. This was equivalent to \$3.69 a share, as against \$1.99 a share in 1934.

Newton Steel Co., Youngstown, had a net loss of \$827,139 in 1935, compared with a loss of \$1,034,036 in the preceding year.

Baldwin Locomotive Works, Philadelphia, and subsidiary companies, in the first quarter of 1936, booked orders totaling \$7,128,704, compared with \$4,643,955 in the same period last year.

American Rolling Mill Co., Middletown, Ohio, in the year ended Dec. 31, 1935, reports for itself and subsidiaries net profit of \$4,310,129 after depreciation, depletion, taxes and other charges, equal after preferred dividends to \$2.41 a share on the common stock outstanding. Net profit in the preceding year was \$966,566, or 59c. a common share. Total sales billed in 1935 rose to \$76,799,385 from \$54,485,114 in the preceding year. Current assets at the end of 1935 were \$42,700,477, against current liabilities of \$11,937,618.

Aluminum Co. of America, Pittsburgh, reported net income for the year 1935 of \$9,571,206, equivalent to \$6.55 per share on the preferred stock, compared with \$6,466,149, or \$4.41 per share in 1934. Dividends on the preferred stock last year were increased to \$2.75 per share from \$1.75 per share in 1934.

Standard Steel Spring Co., Coraopolis, Pa., for the year 1935 reported net income of \$135,711, equivalent to \$1.54 per share on 88,169 shares, compared with \$110,791, or \$1.26 per share in 1934.

TRADE NOTES

Federal Machinery Sales Co., Chicago, has moved its office and sales room from 17 South Jefferson Street to 9 South Clinton Street.

M. K. Frank, mine car manufacturer, has moved to 25 St. Nicholas Building, 450 Fourth Avenue, Pittsburgh.

Roller Smith Co., 233 Broadway, N. Y., has announced the following appointments: George W. Burnes, 259 Delaware Avenue, Buffalo, as sales agent for Buffalo territory; J. J. Cassidy, 72 Jacob Street, Malden, Mass., as sales agent for New England territory; and Goodyear & Hammersley, Inc., 120 Greenwich Street, New York, as special sales agent for utilities in eastern New York and northern New Jersey.

Spring Products Corp. on April 1 removed its plant and general offices to 47-39 Austell Place, Long Island City, N. Y.

Peterson Brothers Corp., 85 Walker Street, New York, has been appointed by Lamson & Sessions Co., Cleveland, as agent in Metropolitan New York, Hudson River Valley territory and New Jersey, and is carrying complete stocks of all standard bolts, nuts, cap screws, etc., produced by this manufacturer.

Carl Schenck, G.m.b.H., Darmstadt, Germany, has appointed R. Y. Ferner Co., 161 Devonshire Street, Boston, as exclusive agents in United States and Canada for line of material testing machines as well as dynamic balancing equipment and static balancing devices for rotating bodies of every sort.

Republic Steel Corp., Cleveland, has appointed following distributors: Equitable Equipment Co., Inc., New Orleans, La., for Enduro stainless steel; York Corrugating Co., York, Pa., for Toncan iron sheets, and Sheet Metal Mfg. Co., Inc., Stamford, Conn., for Toncan sheets. Latter is branch of same firm in Brooklyn which had previously been appointed Toncan distributor.

William G. Harvey Co., 2222 South Geddes Street, Syracuse, N. Y., has been named to handle sale of Ingersoll cutters, manufactured by Ingersoll Milling Machine Co., Rockford, Ill., in upper New York State. Small tool sales of all Ingersoll cutters, including the new Zee Lock cutter line, will be handled by this concern.

Centerless Grinding Works, Bridgeport, Conn., has recently moved from 52 Remer Street to a larger plant at 70 Knowlton Street, to take care of increased business.

General Refractories Company has appointed Braman, Dow & Co., Boston, as dealer agents in the Boston area. Braman, Dow & Co. will carry a complete stock of refractories.

Vanadium Corporation of America has moved general offices to the Graybar Building, 420 Lexington Avenue, New York.

Charles D. Magee, Buffalo, heretofore identified with Oldman Boiler Works, Inc., 32 Illinois Street, has purchased controlling interest in Port Colborne Iron Works, Ltd., Port Colborne, Ont., and will relinquish interest in first noted company to give entire time to latter organization, of which he will be president. Edward B. Magee will be vice-president. H. E. Heighton will continue as superintendent.

The Buffalo Machinery Sales Co., Inc., 841 Grant Street, Buffalo, N. Y., has been organized by Joseph M. O'Connell, president, and Daniel B. Symonds, secretary. Mr. O'Connell was formerly head of the O'Connell Machinery Co. Mr. Symonds has been active during the past five years in used machine distribution in the Buffalo area.

Charles Backer, well known in New Jersey-Philadelphia sales areas, has joined the Wilson Brown, 30 Church Street, New York, dealer organization. Mr. Backer will be active in the New Jersey territory of the Metropolitan area.

PLANT EXPANSION AND EQUIPMENT BUYING



... **Union Carbide & Carbon Co., New York, plans expenditure of \$20,000,000 for widespread plant expansion and improvements.**

o o o

... **Socony-Vacuum Oil Co., New York, will make extensions and improvements in oil refinery at Olean, N. Y., at a cost of \$1,500,000.**

o o o

... **Firestone Tire & Rubber Co., Akron, Ohio, has approved plans for new works at Port Elizabeth, Liberia, to cost about \$1,000,000.**

o o o

... **Chrysler Corp., Detroit, will spend \$500,000 for an addition and equipment to machine shop and parts division.**

◀ NORTH ATLANTIC ▶

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York, affiliated with Standard Oil Co. of New York, plans extensions and improvements in oil refinery at Olean, N. Y., including new equipment. Work will include new unit for solvent extraction and power station. Entire project will cost about \$1,500,000 with machinery. Completion is scheduled next fall.

Signal Corps Procurement District, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until May 15 for 18,000 ft. submarine cable and six reels, and 30,000 ft. telephone cable and 16 reels (Circular 196); until May 19, 525 dynamotor units (Circular 200).

Bakelite Corp., 247 Park Avenue, New York, manufacturer of molded insulation products, etc., has let general contract to M. T. Pedersen & Sons, 280 Hobart Street, Perth Amboy, N. J., for one-story addition to plant at Bound Brook, N. J. Cost close to \$50,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

National Carbon Co., Inc., 30 East Forty-second Street, New York, manufacturer of electric batteries and parts, flashlights, welding carbons, etc., has plans for addition to plant at Fostoria, Ohio, primarily for expansion in furnace division. Cost about \$200,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 12 for 146 one-gal. gasoline fire pots for Brooklyn, Sewall's Point, Puget Sound and San Diego Navy Yards (Schedule 7771).

Durable Engineering Co., 97-04 Rocka-

way Beach Boulevard, Rockaway Beach, L. I., manufacturer of oil burners, parts, etc., has leased space in building at 102-21 Jamaica Avenue, Richmond Hill, L. I., for expansion.

Board of Education, 500 Park Avenue, New York, has let general contract to Comstock Construction Co., 521 Fifth Avenue, for three-story vocational high school, 161st Street and Union Avenue, Bronx. Cost over \$1,000,000 with equipment. William C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

Union Carbide & Carbon Corp., 30 East Forty-second Street, New York, will carry out plant expansion and improvements in different parts of country this year to cost about \$20,000,000, which fund is now being arranged for work. Of amount noted, close to \$6,000,000 will be expended for new plant in South, for which site is being selected, to comprise group of one and multi-story units, with power house, machine shop and other mechanical divisions, for manufacture of chemical products; this plant will be operated by Carbide & Carbon Chemicals Corp., first noted address, an affiliated organization. A plant will be erected for production of synthetic resins, recently developed for use in manufacture of safety glass, to cost close to \$2,000,000 with machinery. Other plants will be constructed costing over \$6,000,000. Remainder of fund will be used for completion of additions and improvements in existing plants, including additional equipment; this latter work to proximate \$4,700,000.

Purchasing and Contracting Officer, Medical Section, Army Base, Brooklyn, asks bids until May 5 for 2016 five-gal. alcohol drums (Circular 81).

Sonoco Products Co., Inc., Garwood, N. J., manufacturer of paper cones, paper tubing and kindred products, plans one-story paper mill in conjunction with local converting plant, for manufacture of box-board, chipboard and allied paper stocks. Cost over \$80,000 with equipment. Main offices of company are at Hartsville, S. C.

National Broadcasting Co., 30 Rockefeller Plaza, New York, plans expansion in transmitting station WJZ, Bound Brook, N. J., to increase capacity from 50,000 to 500,000 watts, including new 640-ft. steel tower, antenna system, power equipment, etc.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until May 7 for fin assemblies for 600-lb. demolition bombs (Circular 297).

Crown Cork & Seal Co., Inc., Eastern Avenue and Kresson Street, Baltimore, plans expenditure of more than \$750,000 in addition to funds now expended for expansion and improvements in plant of Acme Can Co., Philadelphia, an affiliated interest. Work will include new mill for rolling of aluminum and other plant units, with installation of machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 5 for single indicators and dual indicators for aircraft service (Schedule 7762).

Seranton School District, Seranton, Pa., plans manual training department in new three-story junior high school, for which general contract has been let to E. S. Williams Co., 342 New Street. Cost over \$1,300,000 with equipment. Financing has been arranged through Federal aid.

◀ NEW ENGLAND ▶

Hinsdale Paper Mfg. Co., Hinsdale, N. H., has let general contract to J. W. Bishop Co., 109 Foster Street, Worcester, Mass., for new three-story mill, 80 x 200 ft., to replace unit destroyed by fire several months ago. Cost over \$100,000 with equipment. McClintock & Craig, 458 Bridge Street, Springfield, Mass., are consulting engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 5 for 50,000 fuse hole plugs for Portsmouth, N. H., Navy Yard (Schedule 7716); until May 12, copper and brass tubing, and brass pipe (Schedule 7746), seamless steel tubing (Schedule 7747) for Portsmouth and Mare Island yards.

Star Brewing Co., 69 Shirley Street, Roxbury, Boston, has acquired six-story and basement building at 197 Norfolk Avenue, totaling over 175,000 sq. ft. floor space, and one-story building at 85 Shirley Street, and will remodel for expansion.

United States Engineer Office, First District, New York, asks bids until May 4 for duplex stranded wire and 48 500-watt floodlights for Waterbury, Vt. (Circular 397).

United Illuminating Co., 128 Temple Street, New Haven, Conn., has let general contract to Mott Construction Co., 440 Elm Street, for addition to steam-electric generating plant, 62 x 108 ft., at Steel Point, Bridgeport, Conn. New boiler units, stokers, pumps and other equipment will be installed. Cost over \$100,000 with equipment. Westcott & Mapes, New Haven, are architects and engineers.

Board of Education, New London, Conn., has plans for two-story and basement addition to Chapman technical high school. Cost about \$150,000 with equipment. A. G. Creighton, 140 State Street, is architect.

◀ BUFFALO DISTRICT ▶

Eastman Kodak Co., Kodak Park, Rochester, N. Y., has plans for two one and multi-story additions to local plant, and for five-story addition to Hawk-Eye Works, St. Paul Street. Cost \$1,100,000 with equipment.

Moore Research & Service Co., Inc., United Office Building, Niagara Falls, N. Y., manufacturer of carbon products, has let general contract to Wright & Kremers, Inc., Pine Avenue and Main



Courtesy of Sundstrand Machine Tool Co.

FLOOD TOOLS AND WORK with **SUNOCO**

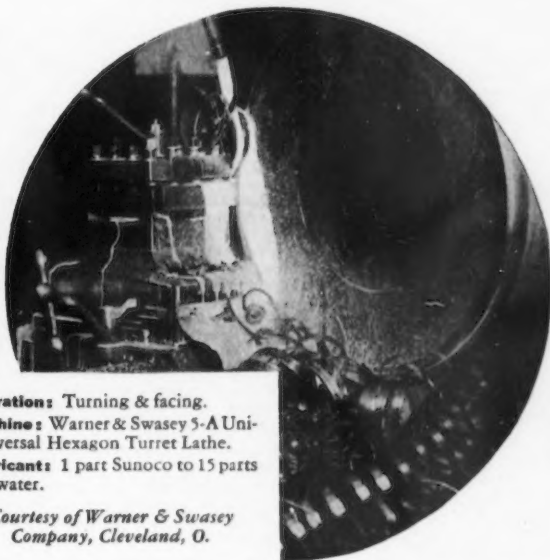


Operation: Finish turn taper, face and form rock bit cone, 6 tools.

Machine: Lodge & Shipley No. 3 Duomotor Lathe.

Lubricant: One part Sunoco to 20 parts water.

Courtesy of Lodge & Shipley Machine Tool Co., Cincinnati, O.



Operations: Turning & facing.

Machine: Warner & Swasey 5-A Universal Hexagon Turret Lathe.

Lubricant: 1 part Sunoco to 15 parts water.

Courtesy of Warner & Swasey Company, Cleveland, O.

Although the modern lathe meets all the requirements for high-speed turning, the production of quality work at rated output depends on the performance of turning tools. They must take heavy, clean cuts at high surface speeds with long runs between tool resharpenings — and that calls for an efficient cutting lubricant.

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Street, for one-story addition. Cost over \$75,000 with equipment.

Buffalo Sewer Authority, City Hall, Buffalo, plans call for bids soon, closing about Aug. 1, for pumping machinery and auxiliary equipment for new municipal sewage disposal plant and system, for which fund of about \$15,000,000 has been secured through Federal aid. Pumping plants are estimated to cost \$750,000 of this amount. Closely following, bids will be taken, closing about Oct. 1, for main sewage treatment works, with screening, purifying, conveying and other machinery, to cost \$4,000,000 of gross sum noted. Greeley & Hansen, 6 North Michigan Avenue, Chicago, are consulting engineers.

◀ SOUTH ATLANTIC ▶

Cudahy Packing Co., 221 North La Salle Street, Chicago, meat packer, has acquired property at Albany, Ga., for new branch plant, with power house and other mechanical departments. Cost over \$250,000 with equipment.

United States Engineer Office, Jacksonville, Fla., asks bids until May 5 for genuine lap-welded charcoal iron boiler tubes, 3-in. diameter, 18½ ft. long (Circular 298).

General Phosphate Co., Beaufort, S. C., care of Charles V. Boykin, 5 King Street, Charleston, S. C., recently organized, plans new phosphate grinding and milling plant at Beaufort, where site is being acquired. To cost over \$300,000 with machinery. Company will also develop phosphate rock properties in several State coastal counties and will install mining, conveying, loading and other mechanical-handling equipment. New company will be capitalized at \$3,000,000. S. A. Guilds, Mount Pleasant, Charleston, is interested in organization.

◀ MIDDLE WEST ▶

Whiting Corp., Harvey, Ill., manufacturer of cranes, foundry equipment and other heavy machinery, has plans for one-story addition, 70 x 256 ft. Cost over \$80,000 with equipment. Burnham Brothers & Hammond, 160 North La Salle Street, Chicago, are architects and engineers.

Great Western Steel Co., 2300 West Fifty-eighth Street, Chicago, has let general contract to Smedberg-Fordell Co., 7937 Indiana Avenue, for one-story addition, 122 x 170 ft. Cost over \$100,000 with equipment. F. C. Foltz, 38, South Dearborn Street, is architect.

Linden Coal Co., St. David, Ill., has let general contract to Patterson & Hartrich, 105 West Adams Street, Chicago, for new power plant at local coal-mining properties. Cost close to \$50,000 with equipment. S. M. Garland & Co., 48 Dearborn Street, Chicago, are consulting engineers.

Board of Trustees, Electric Light and Power Plant, Harlan, Iowa, L. D. Billings, secretary, asks bids until May 6 for extensions and improvements in municipal power station. Cost about \$60,000 with equipment.

American Crystal Sugar Co., Steel Building, Denver, plans extensions and improvements in beet sugar mill at East Grand Forks, Minn., including one-story addition for storage and distribution, equipment, improvements in mechanical-handling facilities, etc. Cost over \$45,000 with machinery.

City Council, St. Cloud, Minn., has secured approval of PWA of fund of \$140,000 for new municipal hydroelectric generating station and Diesel engine-generating plant for standby service, and will begin work soon. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Dearborn Brass Co., 805 B Avenue, N.W., Cedar Rapids, Iowa, manufacturer of plumbers' brass goods, has let general contract to Morehead-Frederikson Co., Cedar Rapids, for one-story addition, 40 x 110 ft., to be used primarily for storage and distribution.

Froedtert Grain & Malting Co., 3800 West Grant Street, Milwaukee, has placed general contract with Burrell Engineering

Co., 400 West Madison Street, Chicago, for erecting and equipping \$350,000 addition to grain elevators and head house. Conveyor system has been sublet to Burmeister Co., Chicago.

Century Machine Co., Madison, Wis., has been organized by A. W. Freeman, 2130 West Mifflin Street, formerly plant superintendent of Fuller & Johnson Co., manufacturer of gasoline engines, Madison, to do a general machine designing, manufacturing and repair business. Shop quarters are being equipped at 319 East Wilson Street.

Milfound Co., Waupun, Wis., manufacturer of gray iron and other castings, expects to resume production by May 1 in new shop replacing foundry badly damaged by fire recently.

Washington County Board, West Bend, Wis., has plans by Vernor H. Esser, architect, 757 North Broadway, Milwaukee, for machine and repair shop and highway equipment warehouse, 52 x 122 ft., two stories and part basement, to cost \$56,300. H. J. Riley is County highway commissioner.

◀ WASHINGTON DIST. ▶

Board of District Commissioners, District Building, Washington, asks bids until May 7 for one full-revolving, crawler-mounted crane, powered by gasoline engine; also for one similar crane with ¾-cu. yd. digging bucket and ½-cu. yd. rehandling type bucket.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until May 13 for water-cooling tower, motor-driven pumping machinery, piping and other equipment for improvements in refrigerating plant at Marine Barracks, Quantico, Va. (Specifications 8197).

Armour & Co., Union Stock Yards, Chicago, meat packers, have plans for new one-story branch plant at 501 Twelfth Street, S.W., Washington. Cost close to \$60,000 with equipment. F. A. Linberg is company engineer.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until May 6 for one electric siren (Circular 144).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 5 for one motor-driven, bolt-threading machine (Schedule 7764) for Charleston, S. C., Navy Yard; for 1,364,000 ¼-in. diameter steel balls (Schedule 7750) for Baldwin Naval Station; until May 8, chain hoists (Schedule 7714), auger bits (Schedule 6403), pressure lubricating guns (Schedule 7705), one motor-driven, die-sinking and engraving machine (Schedule 7690), one motor-driven universal engraving machine (Schedule 7691), approximately 5000 hollow-handle hand drills (Schedule 7711), wire rope, hooks, shackles, anchors and thimbles (Schedule 7729); until May 5, 6000 sq. ft. 36-in. copper-nickel alloy wire cloth (Schedule 7761), and until May 8, parts for motor-boat gasoline engines (Schedule 7728), spare parts for airplanes (Schedule 900-9524) for Sewall's Point, Va., Navy Yard.

◀ SOUTHWEST ▶

Lincoln Engineering Co., 5701 Natural Bridge Avenue, St. Louis, manufacturer of lubricating devices and equipment, parts, etc., has let general contract to Charles Wilcox Contracting Co., 4900 Hooke Street, for one-story addition, 90 x 120 ft. Cost about \$35,000 with equipment. Harris Armstrong, 459 Newport Street, Webster Groves, Mo., is architect.

State Building Commission, Capitol Building, Jefferson City, Mo., Edgar M. Eagan, executive secretary, asks bids until May 12 for extensions and improvements in power house at institution at Marshall, Mo., including new electric generator unit and accessories, boiler and other equipment. Cost about \$229,000. J. H. Porter & Co. and George E. Wells, Inc., both Security Building, St. Louis, are consulting engineers. Bids will be asked at same time for similar work at institutions at Mount Vernon and Fulton, Mo., including new generators, boilers, stokers and acces-

sory equipment. Cost \$200,000 and \$350,000, in order noted. Baumes-McDevitt Co., Railway Exchange Building, and Ralf Toensfeldt, Security Building, both St. Louis, are consulting engineers, for both projects. Charles A. Haskins, Finance Building, Kansas City, Mo., is general supervising engineer.

Shell Petroleum Corp., Shell Building, St. Louis, plans new unit and improvements in oil refinery on Houston ship channel, Houston, Tex., including equipment for replacements and modernization. New docks will be built for storage and distribution, with installation of steel tanks and other mechanical equipment. Entire project will cost over \$1,200,000.

Columbia Steel Tank Co., 1509 West Twelfth Street, Kansas City, Mo., has plans for new one-story plant, 40 x 120 ft. Cost about \$25,000 with equipment. E. H. Gill is chief engineer.

Quartermaster Supply Office, Eighth Corps Area, Fort Sam Houston, Tex., asks bids until May 5 for brass hose nozzles, water hose, etc. (Circular 298).

Board of Trustees, Highland Park Independent School District, Dallas, Tex., plans manual training department in new three-story high school. Bids on general contract recently received have been rejected and new bids will be asked at once. Cost about \$400,000. DeWitt & Washburn, Praetorian Building, Dallas, are architects.

◀ MICHIGAN DISTRICT ▶

Chrysler Corp., 341 Massachusetts Avenue, Detroit, has plans for one-story addition for machine shop and parts division on East Jefferson Avenue, 80 x 930 ft. Cost over \$500,000 with equipment. Albert Kahn, Inc., New Center Building, is architect and engineer.

Gil-Boat Co., Holland, Mich., manufacturer of motor boats, has approved plans for one-story addition, for which superstructure will proceed at once. Cost close to \$30,000 with equipment.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, has let general contract to J. A. Utley, 6031 Mansur Street, for one-story addition to forge shop on East Euclid Avenue. Cost over \$70,000 with equipment.

American Malting Co., River Rouge, Mich., has revised plans for one-story addition for storage and distribution. Cost close to \$40,000 with equipment. G. A. Mueller, 1346 Broadway, Detroit, is architect and engineer.

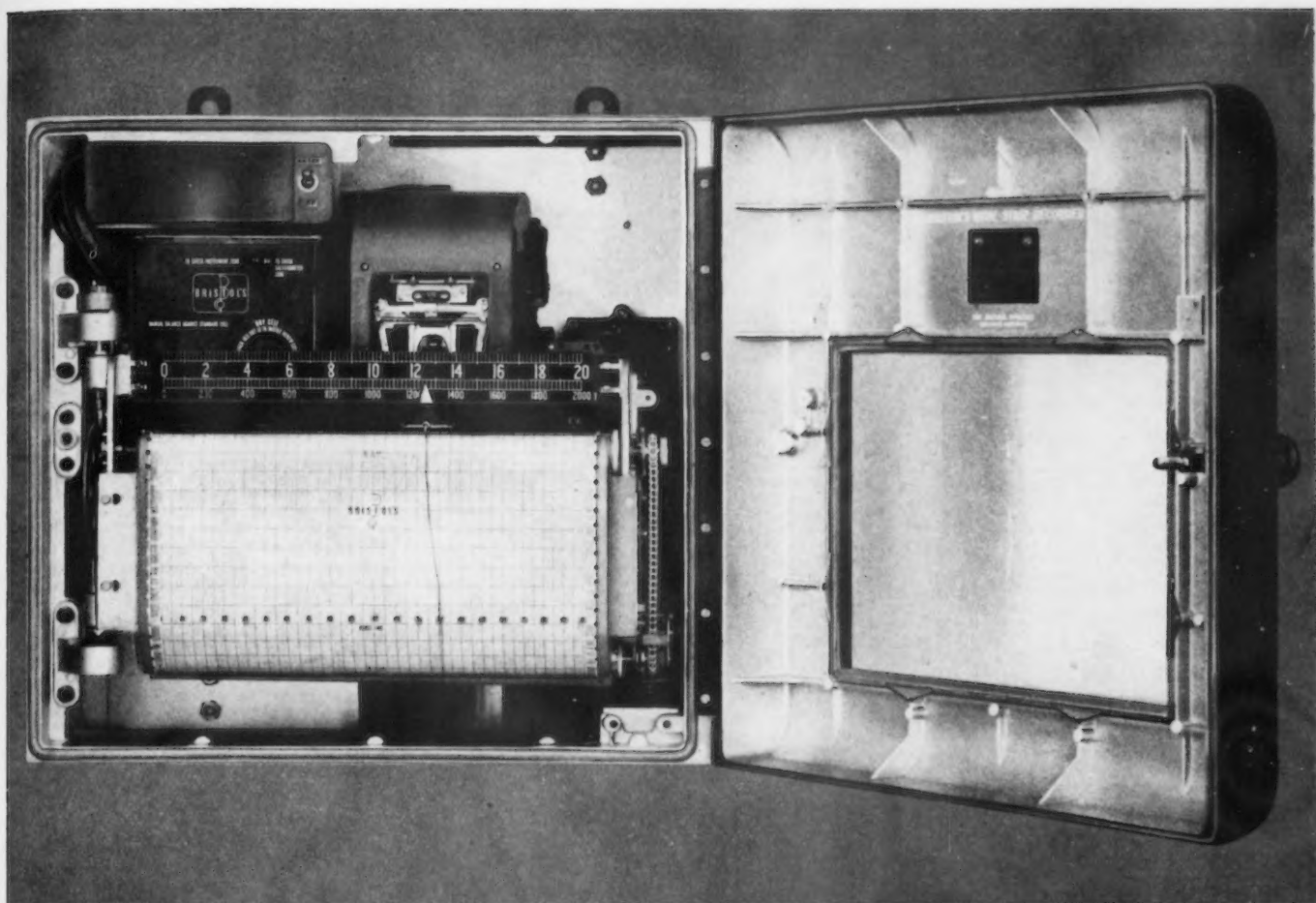
◀ OHIO AND INDIANA ▶

George H. Frederick Distilleries, Inc., Cincinnati, care of George H. Frederick, 4749 Glenway Avenue, president, recently organized, is acquiring property near Harrison, Ohio, for new distilling plant, with multi-story storage and distributing building, power house, machine shop and other mechanical departments. Cost over \$250,000 with equipment.

Owens-Illinois Glass Co., Ohio Building, Toledo, Ohio, is arranging expansion and improvements at different plants to cost about \$9,000,000 during the next 36 months. Plans are under way for addition to branch plant at Muncie, Ind., to double present capacity; additions will be made at plant of Libbey Mfg. Co., Toledo, a subsidiary, to cost over \$1,000,000 with equipment. Extensions will be made in branch plant at Streator, Ill., to cost over \$2,000,000 with machinery. As recently reported in these columns, Owens-Illinois Pacific Coast Co., San Francisco, will soon begin superstructures for new plant at Oakland, Cal., to cost over \$2,000,000. Parent company is arranging for immediate sale of stock to total \$6,338,000, a considerable portion to be used for purpose noted.

Delco Brake Co., 1440 Wisconsin Boulevard, Dayton, Ohio, a unit of General Motors Corp., plans new one-story plant. Part of unit will be used for development and experimental works. Cost over \$50,000 with equipment.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until May 5 for 25 motor landing gears (Circular 781); until May 7, washer



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1. Extra wide 12¼ inch chart.
2. Indicating scale, 1¼ inches high, of far vision design.
3. Fully automatic—self-standardizing, self-balancing, self-compensating.
4. Unit mounting of recording pen and duplex slide wire contact.
5. Dust-proof housing for galvanometer.
6. Duplex slide wires.
7. Case moisture-proof, fume-proof and dust-proof. For wall or panel mounting.
8. Convenient control-index knob.
9. Mercury in glass control switches.
10. Grease-sealed ball bearings; self-lubricating journals.

head screws (Circular 764), six electric furnaces and one electric oven (Circular 789), 100 nozzle assemblies for servicing pump discharge hose, 100 adapter assemblies for servicing pump suction pipe, 100 screen assemblies for servicing pump suction pipe, and 100 end servicing pump suction pipes (Circular 780); until May 8, aluminum alloy rods and tubing (Circular 769), 24 propeller dolly assemblies (Circular 794); until May 9, 24,500 lift-the-dot fasteners (Circular 772); until May 11, pantograph machine, U-clamps, cutter grinder, etc. (Circular 791).

Board of Public Works, Decatur, Ind., asks bids until May 7 for new 2000-kwh. turbine unit, condenser, exciter and auxiliary equipment for municipal power plant. Cost about \$60,000. Bevington-Williams, Inc., Indiana Pythian Building, Indianapolis, is consulting engineer.

Keen Foundry Co., Griffith, Ind., is adding a new core room, 70 x 100 ft., and sand storage building, 40 x 90 ft. Cost about \$25,000, including new insulated ovens and other equipment. Contract has been let to Henderlong Lumber Co., and work will be completed within 60 days.

Whitley County Rural Electrification Corp., Columbia City, Ind., recently organized, plans new transmission and distribution lines in parts of Whitley County for rural electrification, including power substation and service facilities. Fund of \$500,000 is being arranged through Federal aid.

◀ WESTERN PA. DIST. ▶

Electric Vacuum Cleaner Co., 1734 Ivanhoe Road, Cleveland, plans establishment of new branch plant in Arthurdale district, Morgantown, W. Va. Cost over \$40,000 with equipment.

Penn Paint Co., 5811 Penn Avenue, Pittsburgh, has leased three-story and basement building at 5821 Penn Avenue for expansion in storage and distributing departments.

◀ SOUTH CENTRAL ▶

United States Engineer Office, Vicksburg, Miss., asks bids until May 14 for one Diesel engine-driven electric generating set (Circular 247); until May 15 for taps, reamers and end mills (Circular 250); until May 18, 100 conveyor rollers, 200 finger support rollers and 100 mat launching rollers for mat boat (Circular 251).

Southern States Refining Co., Thirteenth Street and Twenty-fifth Avenue, Gulfport, Miss., has plans for new oil refinery on 10-acre tract, for production of fuel oil, gasoline and other oil products. Cost over \$200,000 with equipment, including storage and distributing tanks and facilities.

George T. Stagg Co., Frankfort, Ky., has let general contract to Frank Messer & Sons, Inc., 2515 Burnet Street, Cincinnati, for five-story and basement addition for storage and distribution. Cost over \$100,000 with equipment. Company is affiliated with Schenley Distillers Corp., New York. Carl J. Kiefer, Schmidt Building, Cincinnati, is engineer and vice-president in charge of construction.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until May 6 for addition, 150 x 200 ft., to TVA fertilizer works, Wilson Dam, Ala., primarily for storage and distribution.

Alabama Fuel & Iron Co., Webb Crawford Building, Birmingham, has plans for extensions and improvements in coal-mining properties in Acmar and Margaret districts, near Leeds, Ala., including new equipment. Award for steel framework for new tippie at first mentioned plant has been let to Ingalls Iron Works Co., Birmingham. Contracts for other equipment will be awarded soon. Entire project will cost about \$65,000.

Board of Education, Lavaca and Matagorda Streets, San Antonio, Tex., plans manual training department in new one and two-story junior high school in southwest district, for which bids will be asked soon on general contract. Cost about \$185,000. Phelps & Dewees, Gunter Building, are architects.

◀ PACIFIC COAST ▶

James Graham Mfg. Co., Newark, Cal., manufacturer of stoves, ranges, parts, etc., has let general contract to Austin Co., Oakland, Cal., for two one-story additions, for assembling department and enameling division respectively. Cost over \$40,000 with equipment. B. M. and David B. Clark, 310 University Avenue, Palo Alto, Cal., are architects. Company headquarters are at 695 Bryant Street, San Francisco.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 8 for insulated electric cable (Schedule 7709), 12,000 lb. admiralty metal tubing (Schedule 7738) for Mare Island Navy Yard, spare parts for airplanes (Schedule 900-9528) for San Diego yard, one motor-driven router machine (Schedule 7712), one electric analysis equipment (Schedule 7697); until May 12, three 200-gal.-per-min. centrifugal pumps and spare parts for Puget Sound yard.

Boeing Aircraft Co., 300 West Michigan Street, Seattle, has let general contract to Austin Co., Dexter-Horton Building, for new one-story assembling plant, 204 x 300 ft., on 25-acre tract on East Marginal Way; also for power house, 35 x 50 ft. Cost over \$200,000 with equipment.

Payne Furnace & Supply Co., 338 North Foothill Road, Beverly Hills, Cal., manufacturer of furnaces, parts, etc., has let general contract to L. D. Richardson & Co., 9437 Santa Monica Boulevard, for one-story top addition to present plant, 78 x 150 ft., and for two-story administration building, 42 x 72 ft. Cost over \$50,000 with equipment. William J. Gage, 468 North Camden Drive, Beverly Hills, is architect.

◀ FOREIGN ▶

Central Electricity Board, London, England, has authorized extensions and improvements in several steam-operated elec-

tric generating plants forming units of its "grid" system, with installation of high-pressure boilers, turbo-generators, condensers, feedwater heaters, pumping machinery and other equipment. Extensions will be made also in transmission and distributing lines, power substations and service facilities. Entire project will cost about \$3,000,000 (\$40,000,000), and will be carried out during next 12 months.

Yamakawa Seiyaku K.K., Tokyo, Japan, has plans for new works for production of glycerin and allied products, using rice molasses as raw material. Cost over \$300,000 with machinery. Nippon Kayaku, K.K. (Japanese Explosives Co., Ltd.), Tokyo, is interested in project.

Garden Aero Engines, Ltd., 18 Bloomsbury Square, London, England, H. H. S. Wright, head, manufacturer of airplane engines and parts, has plans for new works near city for parts production and assembling. Cost over \$150,000 with equipment.

City Council, Brisbane, Queensland, Australia, asks bids until July 3 for two steam generating units, superheaters, fuel economizers, air heaters, forced-draft equipment, chain grate stokers and accessory equipment for municipal power plant.

Firestone Tire & Rubber Co., Akron, Ohio, has approved plans for new plant at Port Elizabeth, Liberia. Cost close to \$1,000,000 with machinery. Harvey S. Firestone, Jr., is vice-president in charge.

Gerlad T. Shipman Paper Co., 32 Front Street West, Toronto, Ont., manufacturer of paper goods, has plans for new one-story converting plant, 50 x 400 ft., with adjoining unit, 50 x 150 ft. Cost close to \$175,000 with equipment.

Broken Hill Proprietary Co., Ltd., Melbourne, Australia, is considering construction of new iron and steel works in Fisherman's Bend district, for production of iron and steel castings for automotive industry and other products. Cost over \$150,000 with equipment. H. G. Darling is chairman of board of directors.

Proposed Lake Erie Canal Discussed

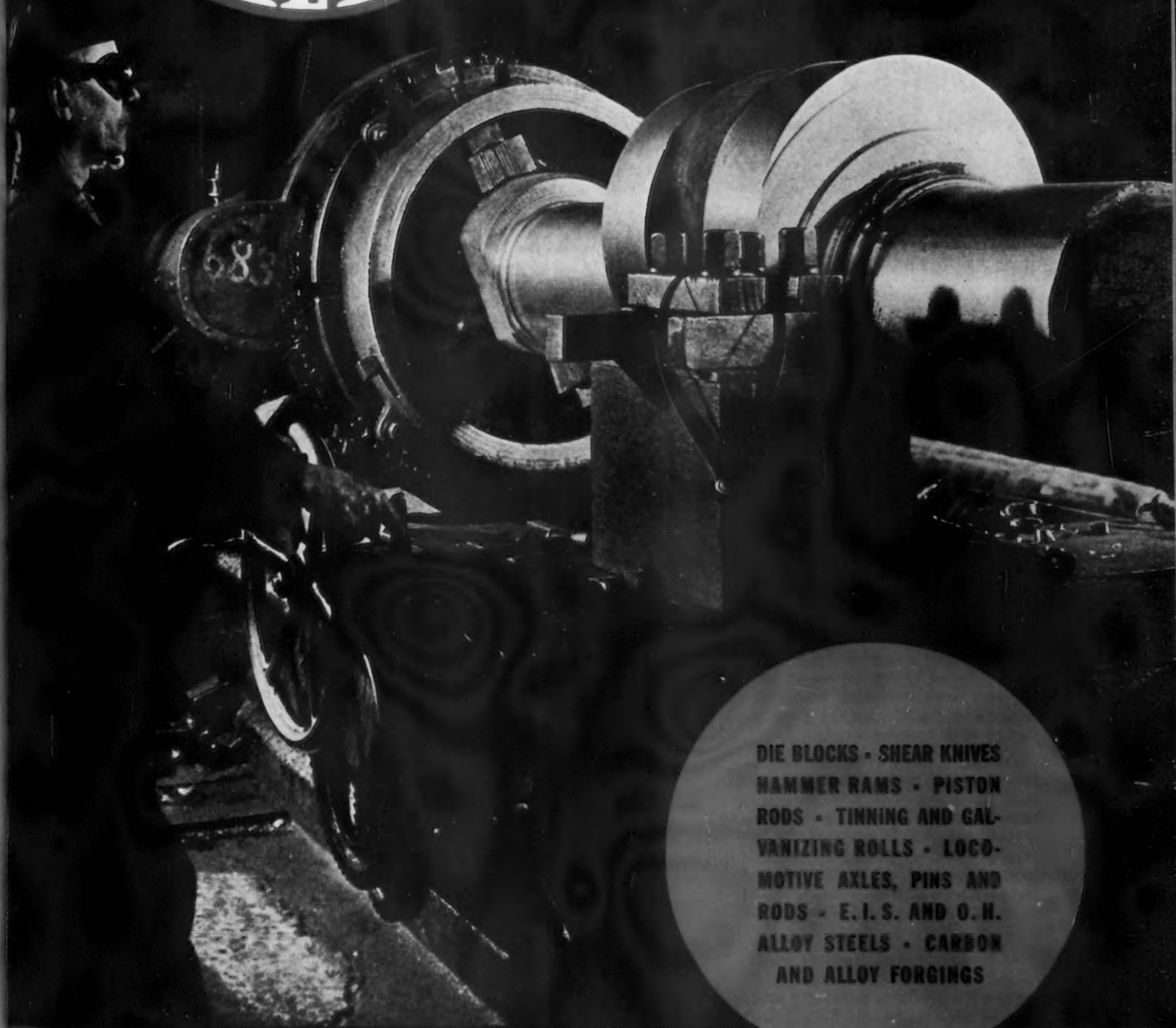
A DECREASE in the assembly costs of ore at Pittsburgh, and a decrease in the delivery costs of Pittsburgh iron and steel and their products to Lake Erie markets are some of the probable advantages which would be obtained by building the long-proposed and much-discussed canal between Lake Erie and the Ohio River, according to a report from the *Pittsburgh Business Review*, published in a brief written in support of the reports of the district and division engineers recommending such improvement by J. C. Argetsinger, attorney for various groups filing the brief.

The present rail rate for iron ore from Lake Erie to Pittsburgh is \$1.15 a ton, or \$2.23 per ton of pig iron. A canal might reduce this charge to \$0.50 per ton of ore, or \$0.97 per ton of pig iron. As a result of such a canal, Pittsburgh steel mills would have to absorb less of the freight charges in order to sell in the Detroit consuming area, and as far as delivery costs are concerned, the competitive position of producers in Pittsburgh and Youngstown would

be strengthened as against producers in other areas.

Disadvantages, also, would arise if such a canal should be built, according to the survey. There would probably be a decrease in the fuel assembly costs for iron and steel plants located on the Great Lakes, and greater decreases in assembly costs for steel plants at Cleveland and other Great Lakes ports than at Pittsburgh. An increase in competition would most likely be brought about with the consequent loss of some markets for iron and steel along the Ohio and the Mississippi. The development of another iron and steel district at the mouth of the canal at Ashtabula would be possible.

Discussions of the eventual advantages of the canal to railroads and the opposition being made at present by the railroads, comparison of routes, cost and carrying charges of transportation unit, cost of transport per ton mile, cost of maintenance and operation, cost of construction and other items are included in the brief which was published for the War Department, the United States Board of Engineers for Rivers and Harbors. Inquiries may be directed to Mr. Argetsinger, Stambaugh Building, Youngstown.



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Progress in Bridge Design Competition

STUDENTS of engineering and architecture in 18 technical schools throughout the country submitted 88 designs in the eighth annual students' bridge design competition of the American Institute of Steel Construction. A jury of nationally-known engineers and architects selected the 10 best from the preliminary drawings for entry into the final judging to be held on May 13. All of the entrants in the competition are actively engaged in studying engineering or architecture.

The subject of the competitive design was a steel highway bridge having a span of 300 ft., with 30-ft. minimum vertical clearance over a river.

The jury selecting the 10 best designs to participate in the final competition consisted of: H. H. Allen, vice-president; J. E. Greiner Co., consulting engineers, Baltimore; Arthur G. Hayden, designing engineer, Westchester County Park Commission, White Plains, N. Y.; Theodore E. Blake, architect, New York; Archibald Manning Brown, president, Architectural League of New York, and H. H. Saylor, editor *Architecture*.

Steel Imports Cost Employees Money!

EVERY employee of the steel industry was deprived of an average of about \$16 in wages during 1935 as a result of sharply increased imports of iron and steel from foreign countries, the American Iron and Steel Institute has calculated from reports published by the Department of Commerce and Department of Labor.

Additional losses in pay were also suffered by employees of mining and transportation companies engaged in supplying the steel industry with raw materials.

During 1935 a total of 405,221 gross tons of foreign-made iron and steel products was admitted into this country—a 49 per cent increase over 1934 imports of 272,369 gross tons. The volume of iron and steel exports, however, exclusive of scrap, which is not commonly sold by the steel industry, declined about 4 per cent from 1934.

Almost the entire tonnage of imported iron and steel competes directly with products regularly made in this country. About 93 per cent of the tonnage exported from this

country, however, is bought by nations which either produce no steel or are dependent on outside sources for a large part of the steel required to satisfy local demand.

Approximately 13,414,000 man-hours of work—equivalent to 6450 full-time jobs—would have been required if the imported iron and steel had been made in this country, it is estimated.

Total losses in the wages of American workers are thus estimated at \$9,500,000 at the average wage rates prevailing in 1935. Of this total, steel mill employees would have received \$6,700,000, or about \$16 for each employee at work last year.

Wages paid to steel workers in the United States range from 120 to 650 per cent above those paid in foreign steel producing nations. Since payrolls take more than 40c. out of each steel dollar, it is apparent that the low wages paid in foreign steel-making countries place American producers at a decided competitive disadvantage in their home markets wherever imports enter. This disadvantage is reflected in the current published prices of steel products which show that the export price of merchant steel bars produced in continental Europe is 1.18c. a lb. or about 36 per cent below the price of merchant bars at Pittsburgh, 1.85c. a lb., and that the export price of European structural steel, 1.12c. a lb., is 38 per cent below the price at Pittsburgh of 1.80c. Similar differences exist between prices of other foreign and domestic steel products.

Unemployment and Unemployment Relief

THE President's statement in his recent relief appropriation message that "at least more than 5,000,000 more people were at work in December, 1935, than in March, 1933," is confirmed by the current estimates of the National Industrial Conference Board, which show an increase of 5,413,000 in the number at work.

The board points out, however, in a study just issued, that this increase in employment has not as yet contributed materially to the solution of the relief problem. The President's estimate of 5,300,000 relief cases would indicate that approximately 18,890,000 persons, or 14.8 per cent of the total population, are receiving relief in some form. To what extent relief requirements are decreasing cannot be accurately determined from the published data of the various Governmental agencies, because those data are

not on a uniform basis and cannot be compared with earlier figures. In addition, there are no published figures showing the situation with respect to unemployables who have been dropped from Federal relief. The solution of the unemployment problem, according to the conference board must be sought, not in increased output and employment in manufacturing alone, but chiefly by an increase in activity in other fields. Manufacturing industry in January, 1936, was giving employment to approximately 8,892,000 persons, or 400,000 more than in January, 1935, and 937,000 more than in January, 1934. It has been able to do this because of an increase in the demand for manufactured products, particularly those of the durable goods industries. A further increase in output would undoubtedly provide employment for additional workers, except in those fields where operation is still on a part-time basis. The attainment of that objective, however, is not wholly within the power of industry.

The board also points out that, so far as manufacturing is concerned, any reduction in hours of work, with the purpose of increasing employment, would probably involve at least some reduction in weekly earnings, since a further increase in hourly rates would not be possible in most industries under present conditions. In January, 1936, labor cost per man-hour in manufacturing was 9 per cent above the 1929 level. The seemingly greater security of relief and the payment of relief wages at prevailing rates have tended to offset whatever advantage private employment may offer in the way of higher weekly or monthly earnings. Any reduction in those earnings as a result of shorter hours would lessen the inducement to accept employment in private industry and contribute to increase the number of persons on relief.

Air-Hose Features Tire Construction

AIR-HOSE design, along lines of tire construction, is embodied in a new line announced by New York Belting & Packing Co., Passaic, N. J. Cords are laid in tough rubber cushions and isolated from adjacent plies. It is said that lighter weight, more flexibility and greater resistance to pressure are advantages over previous products. An especially compounded cover is specified as offering remarkable resistance to bruises and abrasions.